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CONTENTS

ILLUSTRATED ARTICLES

ON THE HIGHWAYS OF COMMERCE

AGRICULTURAL PROGRESS

THE MOTOR CAR WORLD

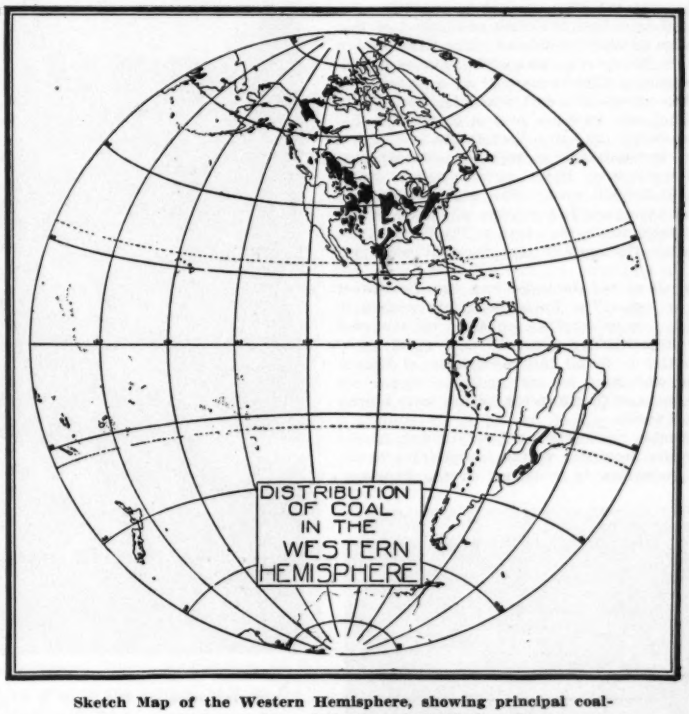
THE COAL RESERVES OF THE AMERICAN CONTINENTS

The Total Visible Supplies of Anthracite, Bituminous and Sub-Bituminous and Lignitic Coals Aggregate 5,105,528,000,000 Tons

By Leon Dominian, of the American Geographical Society, New York *

COAL is the most valuable mineral exploited in the world. It is a product which, once taken out of the earth, cannot be replaced. The study of its reserves therefore appeals to millions of human beings whose comfort and material fortunes depend directly on the production of this fuel. The importance of this topic led to its investigation by the world's foremost authorities on coal. Expert reports from every country were submitted at the Twelfth International Geological Congress, which held its sessions in Toronto last year. The results applying to the American continents are presented herewith.

The map shows that the chief source of coal supply in the western hemisphere is found north of the equator. This happens to be likewise the case for the eastern hemisphere. It is therefore true for the entire world. This is not due so much to the development of large land masses in the northern hemisphere as it is to the existence of vast areas of rocks belonging to the carboniferous period which do not appear to be well represented either in Africa or South America. We have in this a factor of far-reaching economic importance in the commercial and industrial relations between the northern and southern continents of the western hemisphere because it will insure the industrial supremacy of the two countries with abundant coal reserves, viz., the United States and Canada, as long as coal is not superseded by another fuel. It is well to bear in mind, however, that South America is not as thoroughly prospected as the North American continent, and that reserves may yet be eventually discovered within its mass.



Sketch Map of the Western Hemisphere, showing principal coal-producing regions of North and South America

The relation of coal to civilization is apparent from an inspection of any world-map. The most civilized countries lead in coal production. The factor of area or of geographical position appears overshadowed by the importance of that of coal resources. Belgium is a case in point. Nevertheless this does not imply that civilization depends on coal. It means that only 19th or 20th century civilization is partly based on coal consumption. Given the discovery of a more advantageous source of energy and coal will become as unimportant from the standpoint of the world's commerce as are the trade winds in our day.

So much for the general relation between coal and civilization. Let us consider the fuel for a moment as a factor in regional development. Viewed from this standpoint a coalfield may be likened to an immense magnet with the power of attracting human beings in dense agglomerations over and around its extent. Not only in the fields of eastern Pennsylvania, but throughout the world, coal beds have constituted nuclei, as it were, around which settlement, networks of railroads and industrial life thrive. The growing importance of our southern States is due to coal just as much as the development of the city of Pittsburgh. Compare, for example, the 1898 and the 1909 editions of the McAlester Quadrangle topographic sheet issued by the United States Geographical Survey. The first shows the town of McAlester with a few scattered buildings around it. The later edition covers the same region, but what a difference in the detail indicated on the map! Thick black patches now reveal the density of settlement, an intricate network of black lines representing the roads and railroads that radiate out of the numerous populated centers. All of this development, all these signs of activity, are the result of the occurrence of coal in that area. As a rule it will be found that one of the strongest currents of emigration from country to city center around coalfields, the exodus to the cities being much less pronounced in countries where coal is scarce.

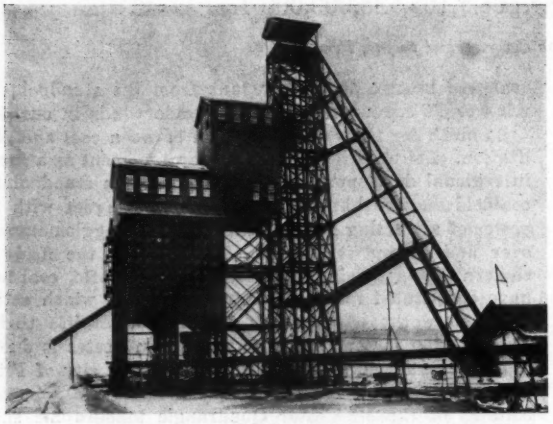
Appreciation of these different facts should accompany the perusal of the statements that follow.

CANADA.—The total Canadian reserve is estimated at 1,234,269,310,000 tons. It may be grouped roughly into four great divisions, of which the first three are of present importance. The workable coal which has already been explored is estimated as follows:

		Tons.
(1)	*The Maritime Provinces:* Nova Scotia and New Brunswick. Bituminous coal only	9,869,968,000
(2)	*The Central Plains and the Eastern Rocky Mountains:* Ontario, Manitoba, Saskatchewan, Alberta. Every grade represented	1,132,624,400,000
(3)	*The Pacific Coast and the Western Mountains:* British Columbia and the Yukon. Every grade represented	80,974,942,000
(4)	*The Arctic-MacKenzie Basin:* Northwest Territories and Arctic Islands. Bituminous and lignitic grades	10,800,000,000
	Total	1,234,269,310,000

* This article is based on data collected by the Twelfth International Geological Congress held in Canada during August, 1913, and in which the writer had the privilege of participating as the delegate of the American Geographical Society. Ampler information and technical details concerning regions mentioned in this article can be obtained by reference to the splendid Monograph on the Coal Resources of the World, published by the Congress.

The largest part of Canada's supply is derived at present from Nova Scotia and New Brunswick. The Nova Scotia coals are bituminous, of good quality, well adapted to the production of coke and excellent for domestic use and for steam coal. It is estimated that this Province contains a total reserve of 4,718,968,000 tons, distributed in both land and submarine areas. The largest supply occurs in Cape Breton Island, in the vicinity of the seaport of



Bureau of Mines, Washington, D. C.

Modern head frame, bins and trestle of H. C. Frick Coke Co., showing fireproof steel construction

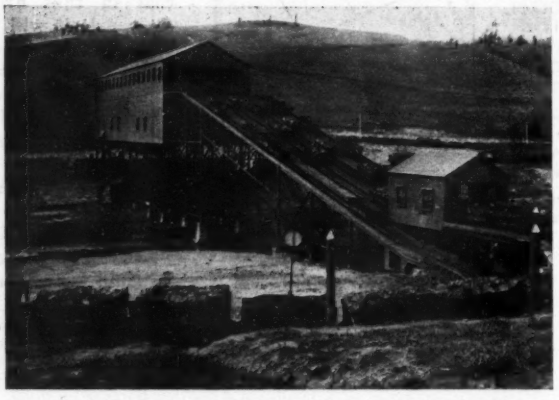
Sydney. Calculations based on actual thickness and extent of this basin reveal that it contains 1,023,000,000 tons. The Cape Breton submarine coal area covers 73 square miles and contains 2,639,000,000 tons of a good grade of bituminous coal at a distance of from 3 to 5 miles from the coast. The coal mined in Nova Scotia supplies the requirements of the Province and is shipped to the eastern part of the United States and the West Indies.

In New Brunswick the carboniferous rocks which contain coal seams cover an area of more than 10,000 square miles. Their supply is estimated at 151,000,000 tons. The coal-bearing area forms a triangle with the base near the eastern boundary of the Province, extending from Bathurst on the north to the Nova Scotia boundary line on the south. The apex is near the southwest portion of the Province.

Large tracts of prairie land in Manitoba and the Northwest Provinces are underlain by coal. The Rocky Mountain section is particularly well supplied. In general the quality of the coal improves with proximity to uplifted regions.

A heavy producing district is found in the vicinity of Crowsnest Pass on the Pacific watershed of the Rockies. Vancouver Island contains the Nanaimo and Comox fields, which were among the first to be worked in Canada.

The coal of British Columbia has contributed very largely to the development of mining by its proximity to the metaliferous areas. About one-third of the production is consumed in the Province,



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Tipple, weighing house and inclined plane of a typical Pennsylvania coal mine

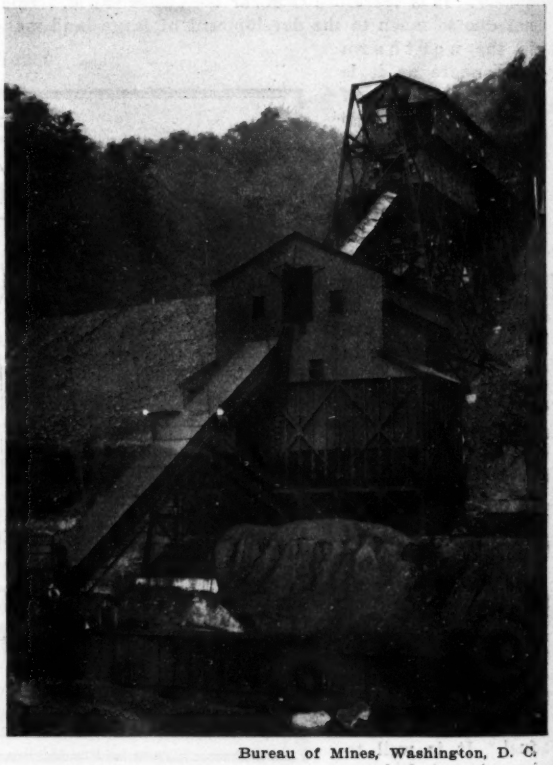
and an equal amount is shipped to the United States. The balance is converted into coke.

The basin of the MacKenzie River is well supplied with coal in the vicinity of the Great Bear River and throughout the MacKenzie delta. In the Yukon district outcrops can be followed for a distance of about sixty miles up the Klondike River. Mining has been confined to the Tantalus field on the Lewes River and Coal Creek, a small tributary of the Yukon, which joins the latter at about 58 miles below Dawson. The Tantalus field is considered important because its seams bear bituminous grades.

In the Arctic Islands coal is known on Banks, Parry, Elsmere, Baffin and Bylot islands. The coal-bearing area of the first is estimated at 6,000 square miles and the sub-lying coal at 6,000,000 tons.

GREENLAND.—Coal is known on the west coast of Greenland on Disko Island and Nunasoak Peninsula. The inhabitants of the first named locality formerly carried on mining at Rittenbenk to supply their local needs. On the east coast exposures of the mineral have been discovered at Kulm and Sabine Islands. The quantity of coal in reserve within the Greenland area has not yet been estimated owing to the lack of proper exploration.

ALASKA.—Alaskan coalfields are well developed along the Territory's coast-line. The fuel has also been discovered in the valleys of the navigable rivers penetrating far inland. Only about one-fifth of Alaska has been surveyed geologically so that the estimate of the reserves of Alaskan coal are necessarily below the actual figures. The known coalfields cover an area of 1,210 square miles. Other fields comprising 16,147 square miles also contain coal, but have not been sufficiently explored. The quantity of coal stored in those areas is calculated at 29,593,000,000 tons, of which 1,931,000,000 is considered anthracitic, 1,369,000,000 bituminous and the balance lignite. An extensive lignitic field occurs in the Bonnifield region about 50 miles south of Fairbanks. The reserves here are estimated at 10,000,000,000 tons by geologists of the United States Geological Survey. This estimate is supposed to be conservative. Nevertheless it exceeds the quantity calculated for any other surveyed field in the Territory.



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General view of tipple in a Pennsylvania mine, showing direct loading onto cars

The best Alaskan coals have been found in the Matanuska and Bering River fields. Anthracite and bituminous coal occur in both. Lignite exists as well in the first. In northern Alaska workable deposits containing all grades are found in the vicinity of Cape Lisburne, in the Colville basin and at Wainwright inlet. The Yukon and Tanana River valleys are likewise well provided with the fuel. The mineral also occurs widely in the Alaska peninsula.

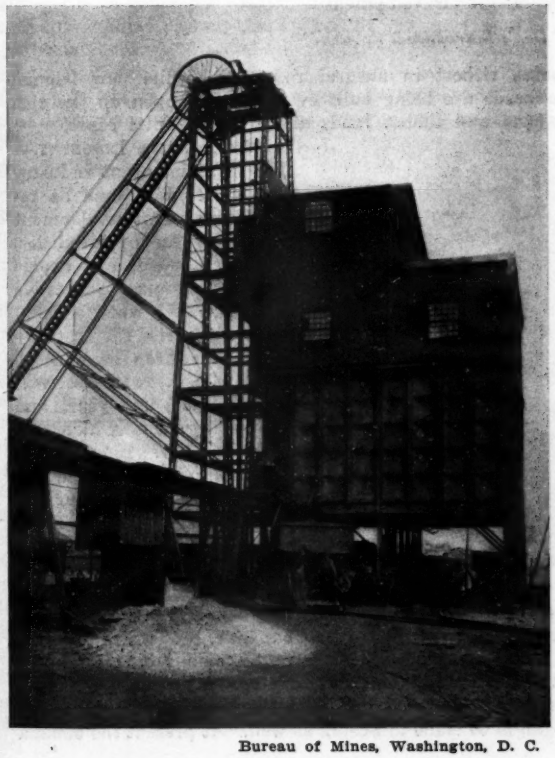
NEWFOUNDLAND.—The carboniferous areas of Newfoundland extend in a northeasterly direction from Cabot Strait. They have been considered by some geologists as the prolongation of the Cape Breton Island fields. It is estimated that, at a minimum, 500,000,000 tons are commercially available. The coal is a good variety of the bituminous type. It occurs on the south shore of St. George Bay and in the valley of the Humber River north of the shores of Grand Lake. Mining in these fields has been hampered by certain restrictions imposed by the Treaty of Utrecht in 1713 which enabled the French to claim exclusive rights to the foreshore of the western coast as a part of the fishing rights conferred on that nation. The result has been that the fuel consumed in Newfoundland was supplied by the Cape Breton fields. A settlement of the differences regarding the rights of France and Great Britain in

Newfoundland has recently been attained. This will undoubtedly allow the development of the colony's coal industry in the near future.

UNITED STATES.—The country's total reserve is reported as follows by the United States Geological Survey to the International Geological Congress of 1913:

	Anthracite Coals.	Bituminous Coals.	Lignitic Coals.
		(In Million Tons)	
Eastern States	16,906	494,454	.....
Interior States	363	478,232	.....
Gulf States	.....	.....	20,952
Northern plains	.....	41,106	1,134,000
Rocky Mts. and Coast States	484	335,460	692,207
Alaska	1,931	1,369	26,293
Coal under heavy cover	.....	604,900	.....
Totals	19,684	1,955,521	1,873,452
Grand total			3,848,657

Every grade of coal occurs in the United States. The bituminous variety is the most important. Nearly all of the coal found east of the Rocky Mountains belongs to this class. The highest grade of coal mined in the United States is anthracite from the Narragansett basin in Rhode Island. The product of this locality is almost a graphite. It is often so badly altered that it loses all its value as a fuel. The anthracite fields of eastern Pennsylvania furnish the best grades of coal. Small areas containing anthracite are also known in the western States. The best known of these is the Cerillos coalfield in Santa Fe County, New Mexico, which covers an area of 30 square miles.



Bureau of Mines, Washington, D. C.

Tipple and coal bins for a mine in the eastern part of the United States

Most of the coal used for coking or steaming and for domestic purposes is bituminous. The areas covered by this variety comprise nearly all the Appalachian region, northern Michigan, the fields of eastern Indiana, Illinois and Kentucky, of western Iowa, Missouri, Kansas and Oklahoma. The fuel deposits of southwestern Texas likewise fall under this classification. Large areas of bituminous coal are also found in the western States. Those of the Trinidad-Raton field of Colorado and New Mexico, of the Grand Hogback field of Colorado, the Book Cliffs field of Utah, the Black Hills field of Wyoming and the Great Falls field of Montana are the best known.

The variety classed by the United States Geological Survey as sub-bituminous has a lower fuel rate than the bituminous grade. It generally resembles a lignite in quality although it is not necessarily woody in appearance. In fact its texture distinguishes it from a true lignite, which is always woody. It is estimated that over 100,000 square miles of sub-bituminous coal areas exist in the United States. This variety occurs principally in the western fields. The most noteworthy localities are the fields in the vicinity of Boulder, Denver and North Park in Colorado; Gallup, New Mexico, Hanna, Douglas, Sheridan and the Bighorn Basin in Wyoming, as well as relatively broad areas in Montana, Washington and Oregon.

Lignites abound in eastern Montana, North Dakota and the northwest corner of South Dakota. There is no doubt that the growing use of gas producer and internal combustion engines will contribute to substantial increase in the mining of lignite. This fuel is present in all of the Gulf States, although its commercial exploitation has been confined to Texas.

Department of Mines, Ottawa, Can.

Sydney mines in the important bituminous coalfields of Nova Scotia, in Eastern Canada

MEXICO.—Coal production in this country is confined at present to the State of Coahuila. The coalfields constitute the prolongation of the Texas deposits. Data regarding their extent and supply are wanting. The value of their annual output exceeds 12,000,000 pesos. A large proportion is consumed by the railway companies. The balance is shipped to Monterey to feed the smelters.

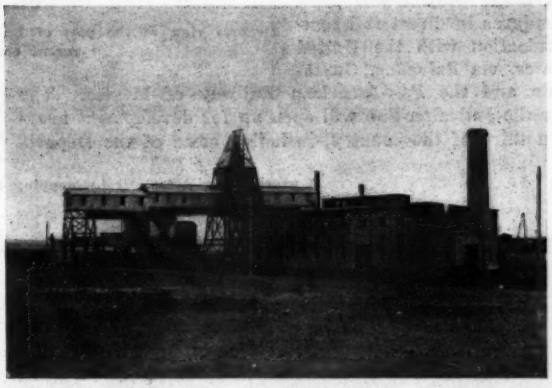
The occurrence of these coalfields will probably enable local industries to thrive as soon as advantage of the country's natural resources will be taken by the natives or by foreigners. The inhabitants of the arid regions of northeastern Coahuila have already been extensively benefited by the mining operations which have provided steady work for the inhabitants of entire villages.

A model town of 4,000 inhabitants has been built by the Mexican Coal & Coke Company in the Las Esperanzas basin of the Muzquiz district. The contract method of mining enables the men to earn from $2.50 to $3 daily, a relatively high wage for Mexico.

In northwestern Mexico, coal is found in the Santa Clara field at about 95 miles north of Ortiz, near the mining town of La Barranca, and in the Calera drainage basin, itself a tributary of the Yaqui River drainage system. The coal found here is claimed to be a true anthracite.

Bituminous varieties are found in the Mixteca district, comprising the western third of the State of Oaxaca and the southwestern portion of Puebla. In the Tezcotlan field of this district excellent grades of the fuel are reported.

The foregoing review of Mexico's coal resources shows how the only district in which the fuel has been commercially developed



Department of Mines, Ottawa, Can.

The Coalhurst mine of the Lethbridge Collieries in the Province of Alberta, in Central Canada

lies at a distance of about 800 miles to the north of the country's densely populated area. The Coahuila fields are furthermore 6,000 feet below Mexico City, which can be conveniently taken as the center of the republic's thickly inhabited section. The combination of distance and altitude force the railroads to charge $4.50 per ton

(*Continued on page 79.*)

Courtesy Honduras Consul General at New York.

Banana cars and repair shop of the Vaccaro Railroad at La Ceiba

THE INDUSTRIES AND COMMERCE OF HONDURAS

A Country of Immense Natural Resources which will soon be Opened Up for Systematic Development

By Edward Neville Vose, Editor of "Dun's International Review"

HITHERTO the most backward of the Central American Republics, owing to lack of transportation facilities, Honduras seems likely in the near future to advance with rapid strides to the commercial position to which its great natural resources entitle it. As described in the May number of this REVIEW, new railways are about to be built that will revolutionize economic conditions throughout a large part of the country. One of these will connect Juticalpa, and eventually Tegucigalpa, the national capital, with the port of Trujillo on the Atlantic coast, while another will connect the towns on the Pacific seaboard with the lines of the International Railways of Central America. When completed, the latter project will place Honduras in direct rail communication with the United States, via Salvador, Guatemala and the Pan-American Railway of Mexico. The Trujillo-Juticalpa line will open up for development nearly a third of the country, including some of the Departments richest in natural resources; while new banana railroads are being built every year to open up the rich banana and timber lands along the Atlantic coast.

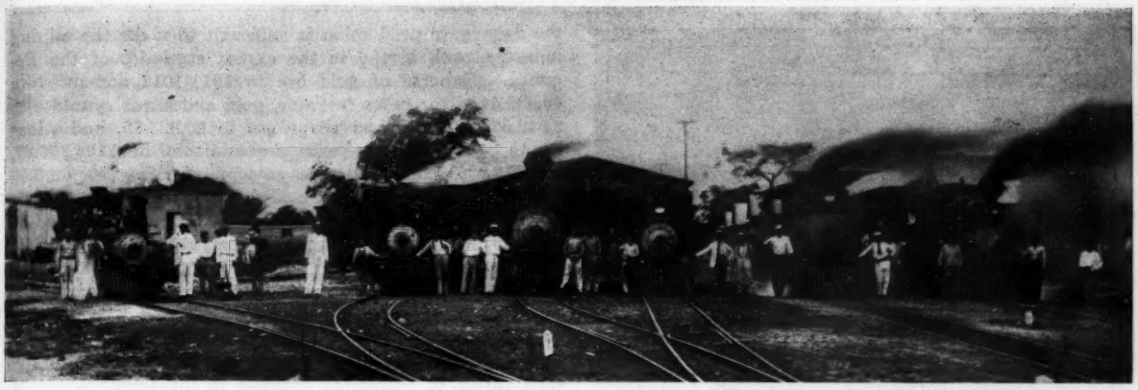
Courtesy Honduras Consul General.

General view of the port of La Ceiba as it appeared before the recent conflagration

THE BANANA INDUSTRY.—The most imporant industry in the Republic, both as regards its present development and its future possibilities, is the cultivation and exportation of bananas. This trade began in 1877 when a small schooner carried the first cargo of Honduran bananas to New Orleans. A steamer was put on the same year, and the traffic gradually increased until in 1887 136 cargoes were shipped from Honduras to New Orleans, amounting to 1,298,269 bunches. These were carried to points in the interior by the Illinois Central Railroad, and in 1888 that line hauled 4,300 carloads of bananas, of which 74 per cent. came from Honduras. In the same year the Atlas Line brought eight cargoes per month to New York and soon afterward direct shipments began to be made to Boston as well. At present the banana

A passenger and fruit train stopping to take on bananas at a local station

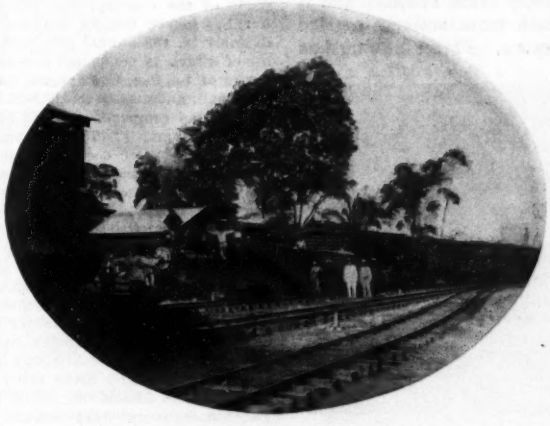
Courtesy Honduras Consul General.



Courtesy Honduras Gonsul General.

Locomotives at Mazapán Station on the Vaccaro Railroad

traffic is highly organized and is the foundation of the prosperity of the ports along the Caribbean coast of Puerto Cortés, Tela, La Ceiba and Trujillo, from all of which direct shipments are regularly made to the United States. As stated in the section on Communications, a network of light railways is in course of construction through the banana lands surrounding each of these ports. At present, the mileage in the vicinity of La Ceiba is the largest, but extensive additions are soon to be made to the network in the vicinity of Trujillo, which, in connection with the important line to be built from that port to the interior, will no doubt make it the most important port of shipment in the country in the near future. In the fiscal year ending July 31, 1912, the total exports of bananas were valued at $1,389,507 (gold). The opportunities for the further development of the industry are almost unlimited, as the lowlands along the entire Atlantic Coast, and for a considerable distance inland along the numerous rivers, are almost ideal for the cultivation of this important staple. The fact that hurricanes, which often devastate the plantations in the West Indies, are unknown in Honduras, has greatly stimulated the investment of capital in this industry in the Republic. At present the region of greatest development extends from the Guatemalan boundary eastward along the coast as far as Iriona, near Cape Camarón. A short distance beyond this cape is the important Patuca River, along which some development work was begun a few years ago, while the entire territory of Mosquitia, lying between the Patuca River Valley and the Nicaraguan frontier, is as yet undeveloped. This region is said to be highly suitable for bananas, great quantities of which grow wild there.



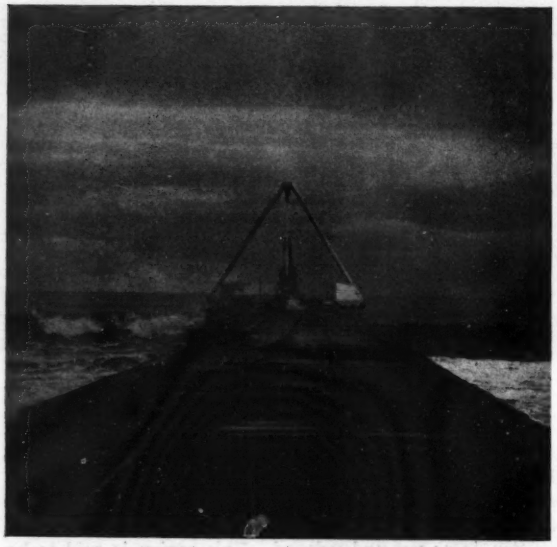
Courtesy Honduras Consul General.

Typical fruit train near La Ceiba, the leading banana exporting port in the Republic

THE MINING INDUSTRY.—Gold has been found in Honduras ever since the first Spanish explorers visited the country, while the discovery of silver was first made some 57 years after the Spanish conquest. During the Colonial period both gold and silver mining were carried on in various part of the province, but operations were considerably hampered by lack of labor. At present the largest mining enterprise in the Republic is the New York & Honduras Rosario Mining Company, which has one of the largest mining camps in Central America at San Juacinto about 20 miles northeast of the capital. This company employs about 2,000 men, of whom 60 are foreigners, chiefly Americans. It has a stamp mill and cyanide plant and two power plants for converting water power into electricity. At Santa Lucia, about nine miles east of Tegucigalpa, are some ancient silver mines from which the output in 1594 was said to have been $7,500,000, of which a fifth was paid to the King, Philip II. These mines were abandoned about the year

A distant view of the port of Tela from the bay

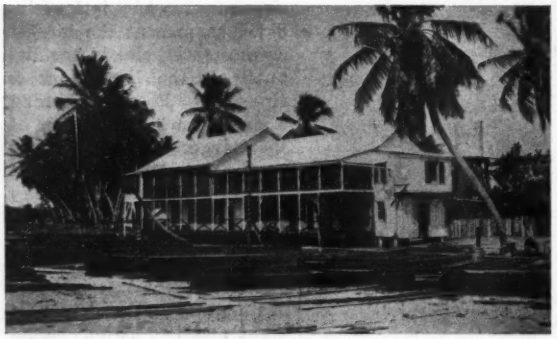
Courtesy United Fruit Company.



Courtesy United Fruit Co.

New wharf now in course of construction at Tela for handling the banana traffic

1823 owing to the impossibility of securing sufficient ventilation at the depth the tunnels had then reached. Gold exists in many parts of the Department of Olancho, soon to be opened up by the new railway from Trujillo, and it is likely that mining will be much more actively carried on in that region in the near future. Placer mining has



Courtesy United Fruit Co.

Chief engineer's quarters recently erected by the United Fruit Company

been successfully conducted by Indians and a few foreign prospectors in Olancho for many years. Producing gold or silver mines are found in practically all of the mountain Departments and, while most of the enterprises are comparatively small, employing less than 100 men apiece, the aggregate production is sufficient to make the mining industry rank second in the export statistics of the Republic. Exports of gold ore in 1911-1912 amounted to 49,939.44 silver pesos in value, gold and silver cyanides to 2,049,527.83, gold and silver ore to 20,823.85, and silver ore to 14,696.25 silver pesos, a grand total of 2,134,986.37, or $853,905 (calculating the gold premium at 150, or 2.50 silver pesos equal to $1.00 gold). There were also exports of coined silver to the value of 325,595 silver pesos, as against imports of silver coins to the value of only $58,440, gold. At Erandique, in the Department of Gracias, there are some opal mines that are said to produce a very fine quality of these precious stones. Coal and iron ore are also said to exist in various parts of the Republic in paying quantities, and concessions have been granted for the exploitation of petroleum deposits in the Departments of Comayagua, Yoro, Atlantida and Colon.

CATTLE RAISING.—The third industry in importance, as regards the value of its exports, is the raising of cattle, for which large areas in the Departments of Olancho and Yoro are particularly suitable. The cattle of Honduras are strong and stocky and in former years the ranches were very prosperous, large numbers of live cattle being exported to neighboring republics, while hides were shipped to the United States. In recent years the industry has declined somewhat, but in 1911-12 exports of cattle were valued at 415,199 silver pesos, and of hides at 267,677.94 pesos. According to a recent estimate there were 725 haciendas in the Republic devoted to cattle raising, the number of horned cattle being estimated at 466,215; horses, 64,122; mules, 13,434; sheep, 24,052, and hogs, 145,352. Exports of mules in 1911-12 were valued at 21,520 silver pesos. With improved transportation facilities it is likely that the cattle industry, particularly in the Department of Olancho, will be greatly extended in the near future.

MINOR AGRICULTURAL INDUSTRIES.—Sugar is raised in many parts of the country, and especially in the northeastern portion, but has never become economically important. Maize is raised extensively, the annual crop being estimated at about 220,000 tons, all of which is consumed locally. Coffee is raised in the Departments of La Paz, Comayagua, Cortés and Olancho, but the exports are small, amounting to 205,522.45 silver pesos in 1911-12—or only $82,208, as compared with $3,544,956 for the coffee exports from Costa Rica and $1,773,105 from Nicaragua for the corresponding year. Exports of cocoanuts amounted to 485,535.85 silver pesos and of leaf tobacco to 50,060 pesos, in 1911-12. A considerable quantity of tobacco, grown largely in the Department of Copán, is consumed locally. There is also a small export trade to Central American countries and the West Coast of South America, leaf tobacco being shipped in bales, while part of the crop is rolled into cigars and thus exported. During the Spanish colonial period grape growing and wine making were important industries in Honduras, but when these products began to compete with the vineyards of the mother country the vines of Honduras were ordered destroyed, and the industry has never been revived.

FOREST PRODUCTS.—Although the forests of Honduras abound in mahogany, pine and many other valuable woods, the exports thus far have been almost nil, owing to lack of transportation facilities. The numerous railways now in course of construction along the northern coast will greatly facilitate getting out some of this timber and exports are likely to show a marked increase in consequence. In 1911-12 exports of mahogany amounted to 17,821 silver pesos, and of other woods to 8,501 pesos. In the same year exports of rubber were valued at 159,473 and of sarsaparilla to 40,142 silver pesos.

FOREIGN COMMERCE.—The total foreign trade of Honduras in the fiscal year ending July 31, 1912, amounted to $7,397,492, of which $4,317,314 were imports and $3,080,178 exports.

General offices of the United Fruit Company at La Ceiba, taken before the recent fire

Courtesy United Fruit Co.

The new town of Tela which will soon become one of the leading banana shipping ports of the country

Courtesy United Fruit Co.

More than half of the imports of Honduras come from the United States, the amount supplied by this country in 1912 being 61 per cent. of the total. This preponderance is partly explained by the superior steamship communications to the United States, and partly by the fact that most of the industrial enterprises in the Republic are being developed with American capital. The following table shows the imports by countries for the fiscal years ending July 31, 1911 and 1912, together with the percentage supplied by each country in the latter year:

IMPORTS INTO HONDURAS, 1911-1912.

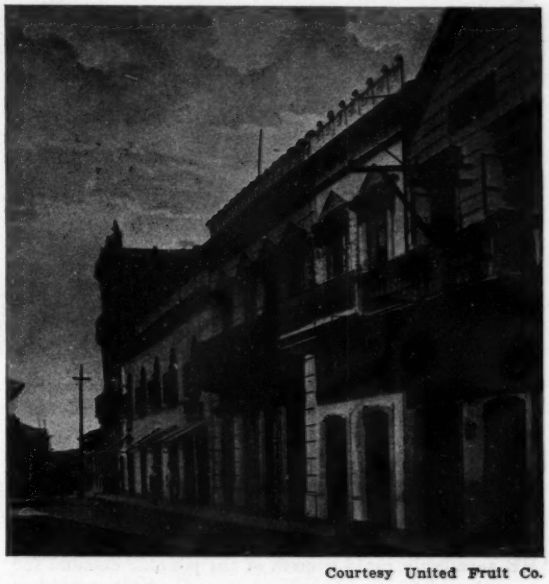
Countries:	1911.	1912.	P.C.
United States	$2,524,133	$2,891,838	60.9
Great Britain	480,698	546,473	12.7
Germany	300,685	487,969	11.3
France	97,771	190,382	4.4
Guatemala	17,687	37,842	.9
British Honduras	19,331	37,535	.9
Spain	26,987	30,343	.7
Nicaragua	9,416	23,284	.6
Belgium	12,661	22,566	.5
Italy	16,704	21,614	.5
Salvador	25,207	8,300	..
Japan	8,098	7,071	..
Mexico	13,054	6,422	..
All other countries	8,507	5,675	..
Total	$3,560,939	$4,317,314	

The official classification of the imports for 1912 has not yet been published, but the following summary from the *Revista Económica*, of Tegucigalpa, will serve to indicate the principal requirements of the country:

Provisions	$461,262	Hose	$17,186
Cotton manufactures	437,915	Soap	16,932
Unbleached muslin	289,974	Carts	16,801
Postage stamps	264,928	Steel cutlery	16,558
Drills	188,391	Kerosene	16,008
Iron and manuf'tures of	187,163	Confectionery	15,978
Prints	173,074	Chinaware	14,561
Chemicals	127,856	Matches	14,288
Timber	99,961	Cement	13,056
Shoes	93,367	Musical instruments	12,058
Agricultural implements	80,880	Silk and mfrs. of	11,785
Silver coin	58,440	Perfumery	11,707
Wines, spirits, beer, etc.	57,490	Tar	10,348
Arms	51,261	Varnish, etc.	9,291
Paper	37,377	Oilcloth	8,678
Oils	30,052	Skins, tanned	8,425
Notions	26,634	Cordage, etc.	8,317
Wire	25,689	Tobacco	7,626
Blankets	24,841	Tallow	6,735
Wool	24,364	Rubber goods	5,897
Dynamite	24,072	Spices	5,834
Electrical supplies	23,746	Lamps	4,885
Leather goods	23,429	Linen	3,909
Laces	21,247	Toys	3,749
Hats	20,463	Animals	3,370
Coal	19,066	Mineral waters	2,761
Furniture, wooden	18,583	Copper goods	1,991
Candles	18,067		

The exports from Honduras by countries for the fiscal years ending July 31, 1911 and 1912, together with the percentage supplied by each country in the latter year, were as follows:

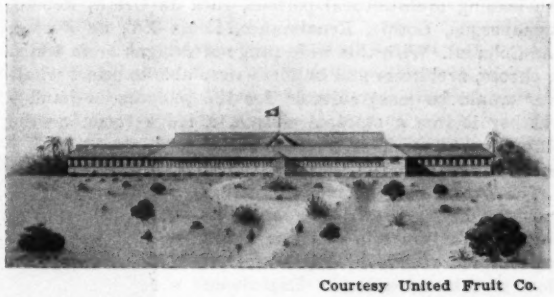
Countries:	1911.	1912.	P.C.
United States	$2,693,027	$2,722,009	88.4
Central America	172,297	132,593	4.3
Germany	107,596	128,756	4.2
United Kingdom	43,518	71,027	2.3
Peru	.....	20,024	.4
France	2,888	1,813	..
Mexico	600	1,328	..
Other countries	4,800	2,584	..
Total	$3,024,726	$3,080,134	



Courtesy United Fruit Co.

Calle del Comercio, showing typical business buildings on one of the leading streets of the capital

As the foregoing figures show, the United States supplies 61 per cent. of the imports of Honduras and takes 88 per cent. of the exports. Great Britain ranks second in the import trade, taking 12.7 per cent.; Germany third, with slightly over 11 per cent.; while France is fourth with a little over 4 per cent. No other country supplies as much as 1 per cent. of the foreign requirements of the country at present. Of the exports, Central American countries take a little over 4 per cent., Germany about the same amount and the United Kingdom slightly over 2 per cent.—the bulk of the exports being taken by the United States, no other country supplying as much as 1 per cent.

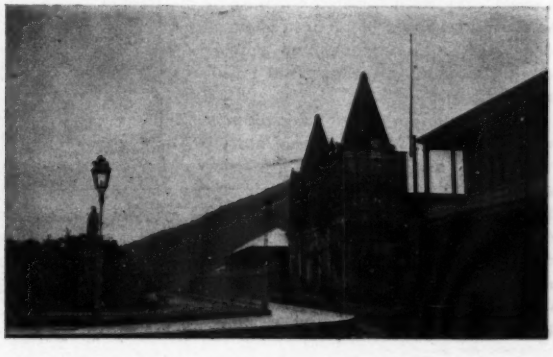


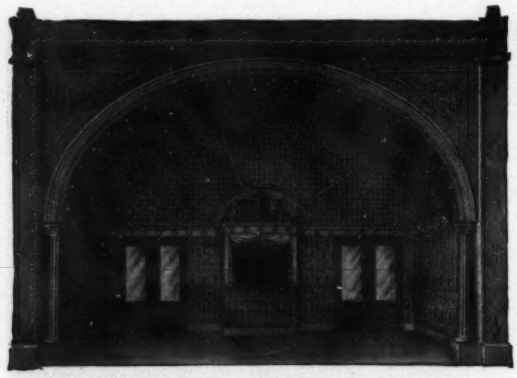
Courtesy United Fruit Co.

Type of hospital now being erected by the United Fruit Company at Santa Marta and Tela

A street scene in Trujillo (at left) and old church in the same town. Trujillo is the terminus of the new railway to Juticalpa and Tegucigalpa

Photos Courtesy United Fruit Co.





An attractively designed theatre front, with double entrance and exit doors, and projecting ticket booth

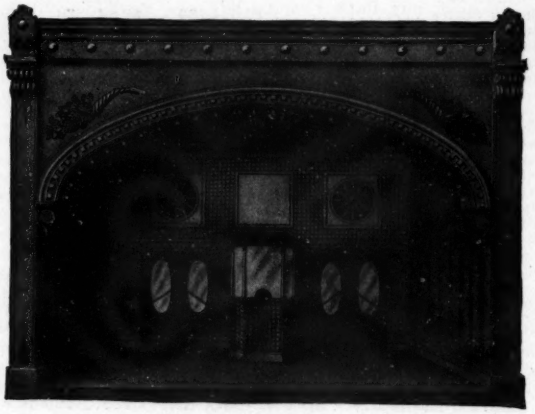
EMBOSSED METAL FOR THEATRES*

How a Standard Product is being Adapted to the Requirements of the Motion Picture Industry

THE amazingly rapid growth of the popular demand for motion pictures in nearly every part of the world has brought with it important developments in several branches of industry not directly connected with cinematography. One of the most notable and interesting of these is the decorative stamped metal industry. While this is itself a comparatively new branch of manufacture, embossed metal products having been on the market for less than a quarter of a century, it is none the less well established and standardized. As regards the principal lines in which stamped metal ceilings and side walls can be used the leading manufacturers have for many years offered buyers a wide range of styles, including designs in all the leading architectural periods, such as Greek, Roman, Romanesque, Gothic, Renaissance, Louis XV, or Rococo, and Colonial. With this wide range of designs from which to choose, architects and builders were able to select whatever would be most suitable for the purpose in hand—whether it was a store, a church, a lodge room, or the different rooms of a well-appointed home.

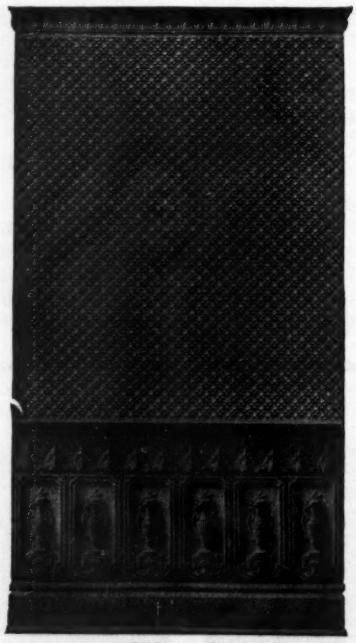
The growth of the motion picture industry, however, gave the enterprising manufacturers in this line a new opportunity of which they were not slow to take advantage. Experience had shown that a motion picture theatre, or cinema, could be made to be extremely profitable with a seating capacity as small as two or three hundred. This fact gave a great incentive to every owner of a piece of idle property, situated on a popular thoroughfare, to reconstruct the street floor into a motion picture theatre. By the judicious use of stamped metal ceilings and side walls, it was found that a beautiful interior, harmonizing in every way with the new purpose of the structure, could be secured at comparatively small expense, no matter how old or shabby the original building might be.

As a result hundreds of property owners have converted unused stores, warerooms, and empty buildings of various kinds into motion picture theatres seating from 200 to 1,000 people, and bringing in an income from 100 to 1,000 per cent. greater than the same property ever realized before. In response to this new and rapidly growing demand, the manufacturers of stamped metal products have made up special combination designs not only for the interior decorations of motion picture theatres, but also for stage fronts and main entrances and foyers, or lobbies. Two of the accompanying illustrations show very attractive front entrance combinations which are being submitted by one leading manufacturer, while the third illustration in this article shows a side-wall design that has proved particularly well adapted for theatre interiors. These are of course simply suggestions, and prospective purchasers are not only given the option of scores of other designs, but several of the leading manufacturers offer to create special designs to meet individual requirements.



A substantial front with two ornamental ventilators and three flat panels for decoration or advertising

With due regard to artistic fitness, manufacturers have taken pains to adapt each design to the dimensions and general character of the surroundings. Where the walls are low and long, it is obviously necessary to achieve quite a different effect from where the room is tall and square. In border decorations, for example, the range is between the narrow rope moulding and the broad Louis XIV border that is almost a frieze. Among the ceiling designs there is an almost endless variety of square and oblong forms, with circular, square and fancy centers, designed to match the proportions of the walls and the other decorations of the theatre.



A tasteful theatre side-wall design—artistic and sanitary

Embossed metal is peculiarly adapted to the transient character of the motion picture house by the simplicity with which it may be put together and taken apart. It requires but little skill to transform a plain, bare-walled room into a bright, dignified, artistic-looking theatre. An ordinary workman may accomplish the task in very little time. And similarly with painting. It is as easy to produce attractive color effects on embossed metal as to hang paper. The design being there, it is only necessary to decide on the desired arrangement of the colors. After that, whoever knows the use of the brush can lay on the paint with the same facility as in stencil work. Even the most complicated designs offer no difficulty here. With a little exercise of judgment in the choice of the design and the planning of the color scheme, a theatre owner will add much to the attractiveness of his place. And when he considers everything generally — the moderate expense, the durability, the wide range of designs, and the attractiveness—he cannot but feel that here is a product that is exceptionally well-suited to his purpose.

* Illustrations courtesy Canton Metal Ceiling Co.

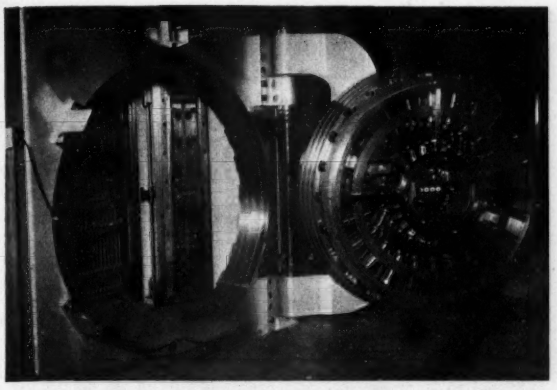


Photo by Edwin Levick.

The circular door of the National City Bank's vault weighs 40 tons and swings on 5-ton hinges

Photo by Edwin Levick.

The outer door and time lock to the vault of the Chemical National Bank, with inner door closed

HOW AMERICAN BANKS PROTECT THEIR WEALTH

Some of the Strong Rooms of Armored Steel and the Intricate Safety Devices that are in Use

By Thaddeus S. Dayton, New York

A MAN'S home is still his castle, but no longer does he bury his wealth under his hearthstone. He may keep some of his possessions in a safe in his home or office, but the bulk of his riches he locks in a huge citadel of steel along with the treasure of thousands of others.

This modern fortress of fortune crowns no lonely crag or mountain top. It is not guarded by soldiers or cannon. It is in the heart of the city; in the center of the rush of men, but far below the pavements trod by their hurrying feet. Its human warders are few, but its mechanical guards are many. The chief of these are steel, concrete and electricity. The first two sturdily resist the assaults of burglars or even of the mighty shocks of the earthquake, while the last gives warning even of the lightest tampering touch.

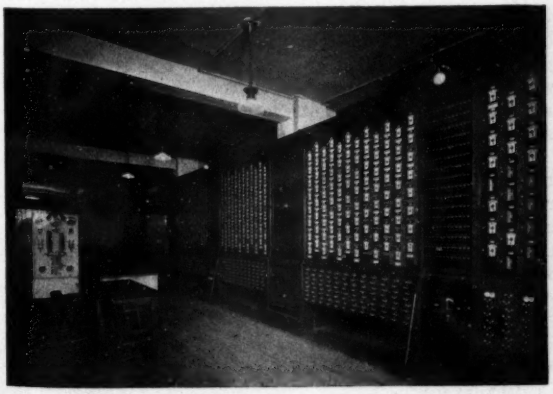
Probably nowhere else in the world are there so many great and massive treasure vaults and such a stupendous aggregation of wealth as in the lower part of Manhattan Island—the financial center of New York City. Within an area of less than a square mile there are more than a hundred of these gigantic "strong boxes." Hardly one of them holds less than a hundred million dollars' worth of coin, bullion, paper currency, stocks and bonds, jewels and other things that represent vast riches in little bulk. How many billions of wealth there are in all these modern caves of Aladdin never has been computed, and probably never will be. Each one of these treasure chambers is as large or larger than the room that the Peruvian Inca filled with gold for Pizarro. In a single one of these vaults—that of a great trust company—the average accumulation of valuable things probably exceeds a billion dollars and may exceed three billions—exact estimates being impossible as the contents of the boxes are known only to their owners. The conquest of Peru yielded only sixty millions—a paltry sum in comparison.

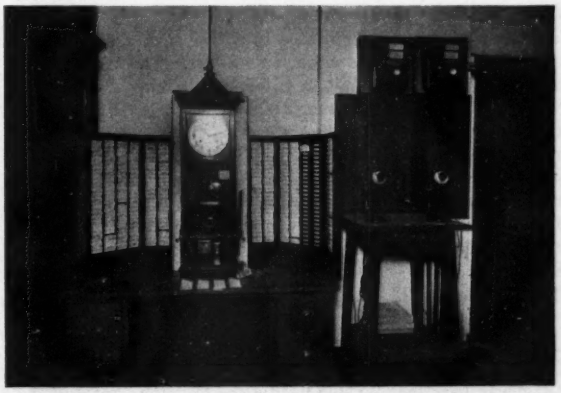
It is a most formidable task to break into one of these modern strongholds. Each one is designed to resist a continuous attack of skilled men, equipped with the best tools, for from ten days to two weeks. A mob of rioters would find it a hopeless task to get into a big safety deposit vault. It would be in danger only from systematic, scientific effort, long continued, that might follow a revolution or a foreign invasion. All of them are warranted to withstand bombs, fire, earthquakes and burglars. Forty years ago the cracksman was ahead of the safemaker in ingenuity, but now the latter is well in the lead.

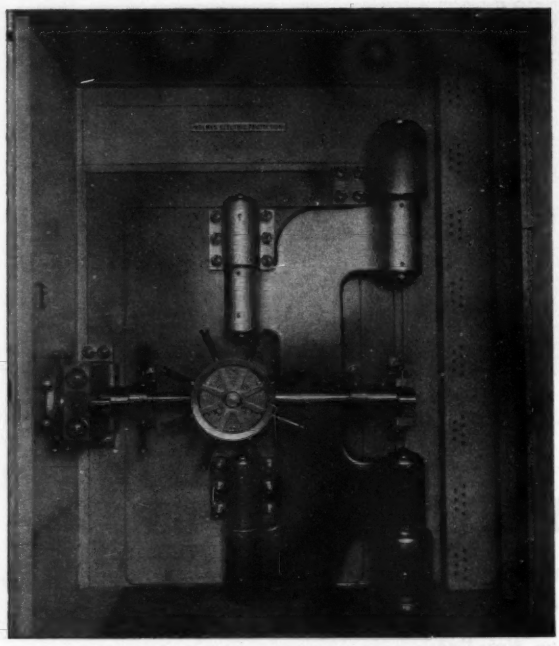
Complicated systems of bolts and bars are the things that are most in evidence when one looks at a safety deposit vault. These are controlled by time locks. The chronometers that are the mechanical masters of the

Headquarters of the Holmes Protective Association, where an alarm is sounded whenever one of the electric burglar alarm wires surrounding the bank vaults of New York is tampered with

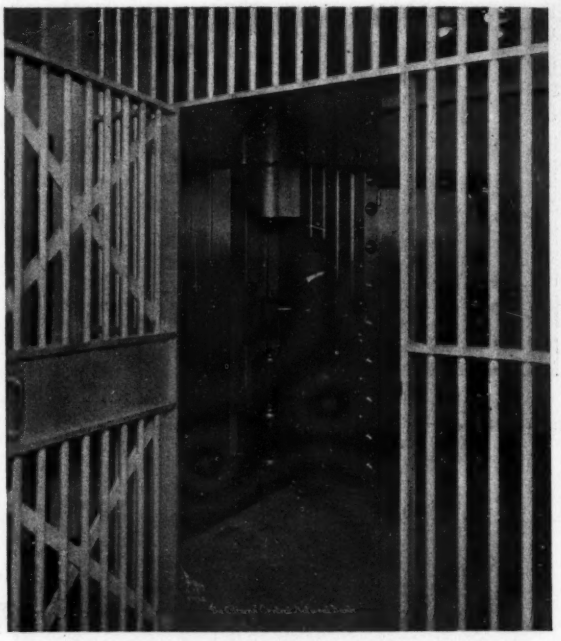
Photos taken by Edwin Levick, by permission of Holmes Electric Protective Company.







Ponderous bolt and hinges to one of the doors to the vault of the Citizens Central National Bank



The same door swung open, showing its thickness, and also the steel barred partition in front of it

treasure are as near absolutely accurate timepieces as it is possible to make. They are wound and set to run for a certain number of hours. At the exact time appointed the clock releases the bolts so that the great doors may be opened.

Every big bank or safety deposit vault has at least two doors, each of which is governed by two or more chronometers. This is to guard against a possible but improbable failure of one of the timepieces. These "clocks" are usually wound and set when the vault is opened in the morning. On week days they are set for a run of twenty-three and a half hours, and when Sundays and holidays interrupt the regular course of business these self-awaking watchmen are set for a run of forty-seven and a half hours or seventy-one and a half. The doors of the vault are never left unguarded at any time.

The combination lock may be set in a hundred million different ways—that is the maximum number of combinations available at present in the most complex of them. On an ordinary safe there are a thousand variations. Usually these combinations are arrangements of numbers. The most complicated assortments of irregular or mixed numbers distributed as much as possible around the combination dial are considered the best.

The typical citadel of wealth, such as those built within the last few years for great banks and trust companies in the Wall Street district,* is armored as heavily as a superdreadnought and ringed around with sensitive tentacles of electricity, ready to give an alarm at the least disturbance. All this is encompassed by a series of other defenses planned as carefully and scientifically as those of a seaport or a city that is the key to a nation's heart. The vault itself is a single structure that is divided into two stories and numerous interior compartments. On each level is a huge outer door, weighing from twenty to forty tons and two or three feet thick. The outer half of each door consists of a steel casing containing concrete and interlaced refractory steel members, together with a plate of special material called "anti-cutter-burner," to prevent the operation of such agencies as the oxy-acetylene flame, which will cut ordinary steel as easily as a knife will cheese. The inner halves of the door are built up of two-inch, five-ply plates of chrome steel, a layer of another sort of steel, and a solid cast bolt frame as the inner section.

The bolt work and locking mechanism of each door are covered with a steel plate to prevent the possibility of releasing the locking dogs by drilling a small hole through the vault wall.

These great masses of steel are so ponderous that they seem impossible to move with human hands, yet one man can open or shut a forty-ton door that is swung on five-ton hinges. By the turning of a hand-wheel in the center the door may be lifted bodily and thrown into a completely closed position. It is so hung that, when "swung-to," the projections on its back surfaces do not exactly oppose the recesses in the door frames that await them, and this lifting becomes necessary. This, also, is a measure of added protection.

When the vault doors are to be closed and the treasure house locked up for the night, the custodians examine the time locks to see that they are set correctly. Then the doors of the various compartments are tried to see that they are closed securely. Then a button on one of the door jambs is pressed and a semi-circular section of the tiled floor, cut away to fit the shape of the open door, begins to sink. It drops about eighteen inches, and the door is closed. Next the polished steel grille that serves as the door of the vault during the daytime is swung back. There is a big plate of steel that forms the doorsill of the vault while it is open. This is lifted by a steel cable, so that finally it rests upside down on the floor of the vault just inside the entrance—still another barrier in the line of defenses. Most of these operations are performed simply by the pressing of push-buttons. Then the great door is swung and lifted smoothly into place. The turn of another handwheel engages the bolts with the time locks, and the vault is sealed for the night.

The lower vault is closed in the same way. If, by chance, anyone has been left inside, despite the preliminary search or the ringings of alarm gongs at intervals, he will not have to spend the night in this cave of Aladdin. On the back wall of each vault is a telephone with a direct wire to the outer world. Beside it is a list of the officers who know the combinations of the vault and their home telephone numbers. One group knows one of the combinations and the other the other. Both must be present to open the emergency door and must take an active personal part in the deliverance.

* While the accompanying description has been confined to the great banks and safe deposit companies of New York City, vaults of equal completeness and strength have been installed by many of the more important banking institutions in various parts of the United States, notably at Chicago, St. Louis and New Orleans.

In addition to the telephone there is a box that looks like a fire alarm signal in which the glass has to be broken to set it in action. By so doing the time locks may be made inoperative, and the big front doors may be opened on the combinations. When they are closed again the time locks take up their interrupted task.

The walls of the vault itself are two or three feet thick. There is a layer of shock and drill-proof steel, and a foot or two of concrete. Outside there are rows of heavy steel rails, and on top a floor of heavy beams of steel to keep the roof from being driven in by the collapse of the building. At the bottom the vault is held up by a massive steel construction, which lifts it several feet above the rock floor on which the building itself rests.

There is a passage surrounding the lower story of the vault, while close to the tiled sides is a section of glass plates that run clear around it. Beyond these is a mirror set at an angle. By looking through the plates of glass one can see across from side to side and end to end beneath the vault. The whole space beneath is brilliantly illuminated by electricity. The watchman can see instantly if the rock floor under the vault has been disturbed in the least by marauders burrowing beneath the earth from an adjoining building.

But these are not all the precautions. Electrical burglar alarm wires are hidden in the concrete of the outer walls. Along every close-spaced steel rail of the many that compose the outer armament of the vault lead-covered burglar alarm cables run, less than two inches apart. Their total length is more than six miles. The bolt work of the huge doors is similarly connected with electric wires. Should the watchmen in the bank be drugged or murdered the burglar alarm company would receive the alarm in its offices outside the citadel.

When the vault has been closed for the night, the pulling down of a little handle at one side, like the handle of a messenger call, notifies the protective company that the doors have been locked. The signal is answered by three taps of a bell. In the morning a similar signal and response give word that the vault has been opened for the day's business.

The inner space of the vault is so large that there are aisles on both stories. Each of these has a steel door with a double combination, protected so that only the person standing directly in front of each can see the numbers as he turns the knob. Inside these solid doors the way is closed by swinging steel bars that are used during the day. The aisles that diverge from the main ones have separate safes, each with a different combination. Some are built into the wall of the vault, others are movable.

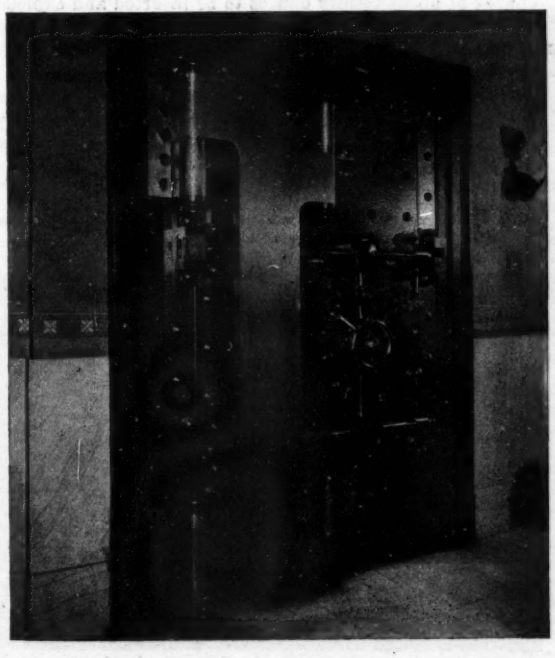
To sum it all up: the thief who gains entrance to the bank from the outside would first have to pass through two or three steel doors to get to the vault itself. Then he would come face to face with a barred steel door visible, by means of an angled mirror, from the anteroom of the vault. Next he would encounter the main doors of the stronghold itself. Suppose he could penetrate these, he would still have to get through the compartment doors, and after them the doors of the individual safes. He would have to pick at least four complicated locks and several time locks of the latest pattern, behind two feet of the hardest steel that science can devise. Then he would have to solve the puzzles of five more combination locks. All this would be of no avail, however, unless he could escape the all-embracing net of the electrical wires that would spread the alarm.

Still another thing—a real physical danger—would the thief have to face in an attempt to storm some of the money fortresses. Around some of the vaults, not apparent to the casual observer, are rows of steampipes pierced with many jets. If rioters, for instance, should attack the place they could not come within five feet of the steel walls without finding themselves enveloped in a scalding white cloud. Not one would escape alive.

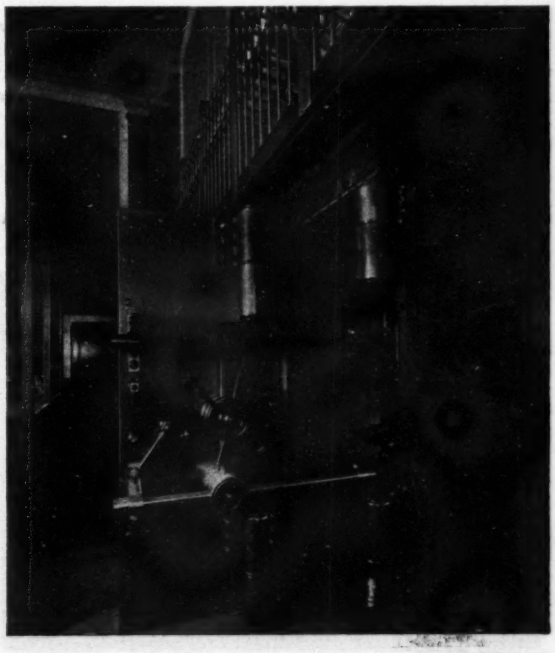
But, supposing that anybody was able to get inside one of these citadels, and put his hands on the two or three billion dollars' worth of money and securities stored there. The chances against his being able to carry away any great part of it would be as small as those of his effecting an entrance. Half a million in gold weighs about a ton—so stealing the metallic treasure would be out of the question unless a line of moving vans and a company of men stood ready to help. Ten thousand dollar notes do not take up much room, and the thief might walk off with a small fortune in currency of that denomination, if he knew where to find them. But he would find it difficult to dispose of them. Take it all in all, he would see so much wealth that he could not carry off that he would not know what to choose. At any rate, he could not steal enough to make an appreciable hole in the pile.

Nitroglycerin is the safe burglar's greatest friend. About ninety-five per cent. of the danger that locked up

Closed outer door to the safe deposit vaults of the Hibernia Bank & Trust Company, New Orleans



Outer door ajar of the vaults of the Chemical National Bank. The time lock is on the other side



Official setting time locks to the lower vault of the Guaranty Trust Company; the corridor showing the depth of the vault. At the right 40-ton door to the upper vault and the patrol constantly on duty

money runs is from this cause. To resist its attack, in the hands of a skilled cracksman, the safe must be of good material and workmanship. There are other dangers which appear more formidable, but they are not, because they take time and heavy apparatus. Burglars have not availed themselves of these things as yet, although the far-sighted builders of safes and great bank and safety deposit vaults have provided adequate protection against them. Methods of generating high heat are those most generally feared. The first of these to be discovered was a device employing electricity. Later came thermit and the oxy-acetylene blowpipe. But the difficulties surrounding the use of these potential aids to the safe-breaker are too great to admit of their employment even by the scientific burglar—if such a person exists. The conditions under which the burglar must work are such that the latest and best safes and vaults have not suffered from them. Every safe-breaker is limited as to time. Probably an attack by force on a safe never has been kept up more than three hours. Concrete is one of several things that will withstand effectually even the fierce heat of the ignited combination of oxygen, hydrogen and acetylene gases. Practically the only thing that is to be feared, therefore, is a revolution or foreign invasion which would enable a corps of technically equipped men to work in shifts continuously at drilling and battering their way through the walls of a massive vault. Even under such circumstances from a week to two weeks would be necessary to effect an entrance.

The first safe, as we know safes, was invented about a century ago by a man named Fitzgerald. It was made of iron and built square—a formidable thing to look at it, but it was not burglar-proof. The first safe burglar drilled a hole in its side and opened the lock from within. The next improvement was to make the walls so they could not be drilled through. Then the safe-breaker discovered that the vulnerable point was the door. It could be wedged open or the lock could be broken out and the bolts shot back. Fifty years ago, other improvements having been made, the burglar resorted to explosives to overcome them. The airtight safe was the next step in the contest between safe-maker and safe-blower. This was followed by a thickening of the walls, and the invention of a safe constructed of one continuous plate with round corners and a concealed lock, resembling in its entirety a big boiler.

Here is a severe test to which a safe was subjected not long ago to prove its ability to withstand the roughest usage that could be given it at the hands of skilled burglars who were theoretically allowed every opportunity. The safe was first stripped of all outer trimmings, and then an attempt was made to dent the manganese steel surface across the joint where the door fits the body.

In five minutes' steady work a furrow an inch and a half long, three-sixteenths of an inch wide and an eighth of an inch deep was made. Into this dent one-eighth of an ounce of nitroglycerin was poured and exploded with a battery and a fulminate cap. The only effect was to discolor the metal. This was repeated seven times, a quarter of an ounce of explosive being used on each occasion, and the crevice became a hairsbreadth wider. Four successive charges of nearly an ounce each of nitroglycerin were then used, then two-eight and one-half ounce charges; then one ten-ounce charge. Then the door bulged about three-fourth of an inch. This enabled the fifteenth and final charge of about twenty ounces to be inserted and exploded. This blew the door completely off. But the contents were still protected by three inches more of manganese steel, which was wedged in so tight that nothing could budge it. Altogether more than forty ounces of nitroglycerin were used—four times as much as any burglar would employ—and still the contents of the safe remained secure against the assault.

Emergency door to the vault of the Bank of Montreal, for use if an employee is locked within

One of the vaults of the American Exchange Bank, with doors closed; another with both doors open

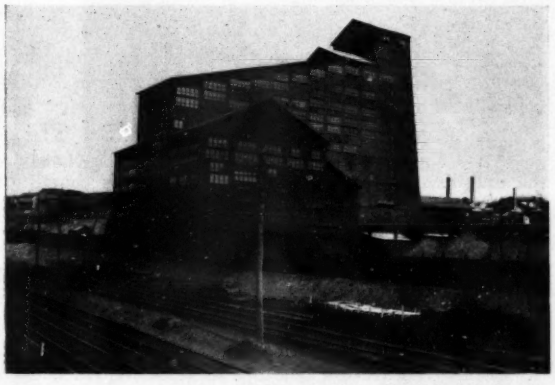
THE COAL RESOURCES OF THE AMERICAN CONTINENTS

(*Continued from page 70.*)

as freight between the site of production and the markets of the capital, so that normally (that is to say in periods of internal peace) the fuel is sold at about $10 per ton in Mexico City. Foreign coal, which is either American or British, sells at about $1 per ton higher. In this case also the haul from the coast to the centers of consumption scattered on the Mexican plateau is arduous and costly. The freight rate on coal between Vera Cruz and Mexico City is $4.75 a ton. These prices have naturally stimulated the development of hydro-electric plants. Effort is also made to utilize the country's vast supply of petroleum as fuel.

WEST INDIES.—The coal supply of the West Indies is derived mainly from Canada and the United States. The fuel has been discovered only in Trinidad and Santo Domingo. Two districts are known in the former island. They occur north and south respectively of Cocos Bay on the east coast. Promising indications have been found in the Cunapo district, which is the northernmost of the two. Two seams are known here with outcrops extending over a mile. The coal is lignitic and needs washing previous to marketing. It is claimed that an excellent grade of briquettes can be obtained from it.

The southernmost district is known as the eastern coal district. The lignites found here are often mixed with sandy or shaly material. It is believed that they can be used locally to advantage as a cheap substitute for the charcoal consumed by cocoa planters for artificial drying, as well as by blacksmiths and native land owners. The tonnage existing in the island cannot be ascertained as precise measurements have not been undertaken. Thirty-four seams of



Bureau of Mines, Washington, D. C.

A large anthracite breaker in one of the eastern Pennsylvania fields of the Appalachian region

coal ranging from 2 inches to 4 feet 5 inches in thickness are known, however, in the eastern coal district.

In Santo Domingo lignite is found in the eastern part of the island, in the Samana district.

SOUTH AMERICA.

COLOMBIA.—Coal measures occur in the western area of the republic. The mineral is found in the Departments of Cauca, Valle, Cundinamarca, Boyaca, Antioquia and Nariño. The coal belongs to a good grade of bituminous. A little mining is carried on in Cundinamarca and Boyaca, the product being consumed for railway, metallurgical and domestic purposes. It is estimated that all known seams of a thickness of one foot or over contain 27,000,000 tons to a depth of 4,000 feet. This figure does not include the reserve in the Department of Nariño, which is believed to be very large in the region of the Putumayo River. The resources appear to be centered chiefly in Cauca and Valle, where they are estimated to attain 20,000,000,000 tons and to extend over an area of 3,900 square miles. In Cundinamarca and Boyaca the coalfields cover 1,170 square miles and contain 6,000,000,000 tons. A reserve of 1,000,000,000 tons is estimated for the Department of Antioquia.

VENEZUELA.—Coal is found in the valleys of the Naricual, Capiricual and Tocaropo. Outcrops have been explored along the course of the Araguita, one of the tributaries of the Naricual. The fuel is of a sub-bituminous variety. It is mined in the vicinity of Barcelona and hauled by rail to the port of Guanta. The Government consumes all the Naricual product for its steamboats. It is estimated that between 5,000,000 and 6,000,000 tons exist in this locality. Mining is also carried on at Coro, at a distance of about 14 miles from the harbor of La Vela.

ECUADOR.—Coal is not mined at present in this republic, although its occurrence is known in the Province of Canar, at Cojitambo, Mangan and Biblian, in a district which is about 50 miles south of the Guayaquil & Quito Railway. Anthracite has been discovered at San Antonio de Pomasqui, north of Quito.

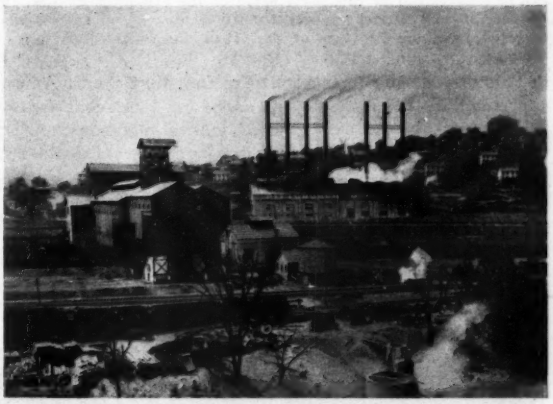
PERU.—Coal is widely distributed in Peru. At least fifteen different coal-bearing districts are known and it is estimated that they contain a minimum of 1,000,000,000 tons. The following localities are the most important: (1) A basin in the Department of Tumbes, stretching along the Pacific Coast over an area of 450 square miles. (2) At Tambo Grande in the Department of Piura. (3) Bituminious varieties are found in the Department of La Libertad, in the Province of Pacasmayo, between the coast and Cupisnique and Trinidad. Also in the Provinces of Santiago de Chuco, San Pedro, Otuzco, Huamachuco, Pataz and Trujillo. Abqut 15,000,000 tons of anthracite are estimated to sublie a basin near Huaiday. (4) The deposits of the Provinces of Catatambo, Huari and Pallasca in the Department of Ancash are considered important. At San Antonio, the tonnage is set at

Department of Mines, Ottawa, Can.

One of the mines of the Western Fuel Company at Nanaimo, British Columbia, in western Canada

4,000,000 tons. (5) Anthracite is found in the Province of Chota, Department of Cajamarca. The tonnage of this field is estimated at 700,000,000 tons. The same grade of fuel is also known in the Cajambamba Province. (6) One of the most important of the Peruvian coal-bearing areas occurs in the Provinces of Parquin and Quiruragra, Department of Lima. The reserve here amounts to 720,000,000 tons. Still in the same Department, coal of a good grade is found at Checras in the Province of Chamcay. (7) On the east shore of the Andes a field extending over 468 square miles and lying entirely within the Department of Junin contains 600,000,000 tons. Other Peruvian coal-bearing localities are found at Lagunillas (Ica), Ichuna (Moquegua), and at Morro de Sama along the Tacna coast.

BOLIVIA.—Coal is found in the Peninsula of Copacabana in Lake Titicaca. A little mining was undertaken in the year 1880 and abandoned subsequently. Soft ground and heavy cost of timbering appear to have seriously interfered with the operations. The valleys of Santa Cruz and El Beni also contain coal-bearing portions. Neither has been prospected so far.



Bureau of Mines, Washington, D. C.

Shaft house, washery, power houses and bee hive coke ovens with flue gas burners under boilers

BRAZIL.—Bituminous coal is reported from the Province of Pernambuco in an area 250 square miles in extent. The country's main reserve, however, appears to be centered in southern Brazil within coal measures which present characteristics of similarity to the Karroo fields of South Africa and the Gondowna coals of India.

Mining operations have been carried on on a small scale at Tubarao, in the State of Santa Catharina, as well as at S. Jeronymo, Rio Negro, Candiota and Jaquarao in the State of Rio Grande do Sul. The Santa Catharina coal is generally high in ash and belongs to a fair bituminous grade. Other known coal-bearing localities are the valleys of Gandarella and Fonseca Rivers in the State of Minas.

CHILE.—Chilean coal occurs in the Provinces of Aranco and Concepción. The total reserve attains 2,082,000,000 tons. The

Department of Mines, Ottawa, Can.

A mountain of coal with outcrop exposed at Corbin, British Columbia

Bureau of Mines, Washington, D. C.

Pneumatic locomotive employed in the gassy mines of the H. C. Frick Coke Co., in the Appalachian field

best grades are found in the Santa Maria Island zone which extends south of the Bio-Bio River to the parallel of latitude which crosses Contulmo and is bounded on the east by the Nahuelbuta range, west of which is spreads to the Pacific Coast.

The beds underlie an area of 1,110 square miles, of which 186 are submarine. The resources here attain 1,026,000,000 tons. The coal is bituminous to sub-bituminous in grade, somewhat high in ash. It belongs to a good steaming variety. About 1,000,000 tons are produced annually from this field.

North of the Bio-Bio River lies the "La Quiriquina" basin, spreading over a mainly submarine area of about 100 square miles in the vicinity of the Tubbes Peninsula. Relatively insignificant mining operations have been carried on here.

Anthracite occurs in the mountainous eastern section of the country. Known localities are Santiago, San Felipe, Illapel, Paloma de Oralle and Ternera de Copiapo. The coal is generally flameless and slow burning.

The production from Chilean collieries has been rising steadily in the past ten years. About 1,334,000 tons are mined annually at present. This quantity being insufficient for the country's requirements over 1,500,000 tons are imported annually. The bulk of the imports are derived from Great Britain and Australia. A small quantity of about 70,000 tons is provided by the United States.

URUGUAY.—There is reason to believe that the coalfields of southern Brazil extend beyond the Uruguayan boundary. Borings have revealed the occurrence of the fuel close to the Brazilian frontier. The measures are covered by a heavy mantle of rock layers and require considerable exploration with the aid of diamond drilling before their extent and grade can be determined.

ARGENTINE.—Bituminous and sub-bituminous grades have been discovered at Salagasta, in the Province of Mendoza. As far as can be ascertained at this early stage of the exploratory work, the reserve of the district exceeds 5,000,000 tons. The fuel is also reported from the Province of San Juan and in the Territory of Neuquen.

This distribution brings out the fact that South American countries are not self-dependent for their coal supply. It also reveals the existence of markets of consumption which deserve investigation on the part of coal dealers in the United States. The time is particularly opportune at present since the opening of the Panama Canal will increase the facilities with which ocean freight can be transported economically to the progressive west coast of South America.

THE COAL RESOURCES OF THE AMERICAN CONTINENTS

(As estimated by the Twelfth International Geological Congress, 1913.)

	Million Tons			
	Anthracitic Coals.	Bituminous Coals.	Sub-bituminous and Lignitic Coals.	Total.
North America:				
Newfoundland	.....	500	.....	500
Canada	2,158	283,661	948,450	1,234,269
United States (including Alaska)	19,684	1,955,521	1,873,452	3,848,657
Central America:				
Honduras	.....	1	4	5
South America:				
Colombia	.....	27,000	.....	27,000
Venezuela	.....	5	.....	5
Peru	700	1,339	.....	2,039
Argentina	.....	5	.....	5
Chile	.....	3,048	.....	3,048
Grand totals	22,542	2,271,080	2,821,906	5,115,528

It is interesting to note that this estimated tonnage of the coal reserves of the American continents constitutes 69 per cent. of the world's total supply, which is calculated at 7,397,553,000,000 tons. A percentage of such magnitude should be considered as a happy presage of the role in store for American preëminence in a period of world-wide industrial activity which is yet only in its dawn in spite of the immense progress of the past fifty years.

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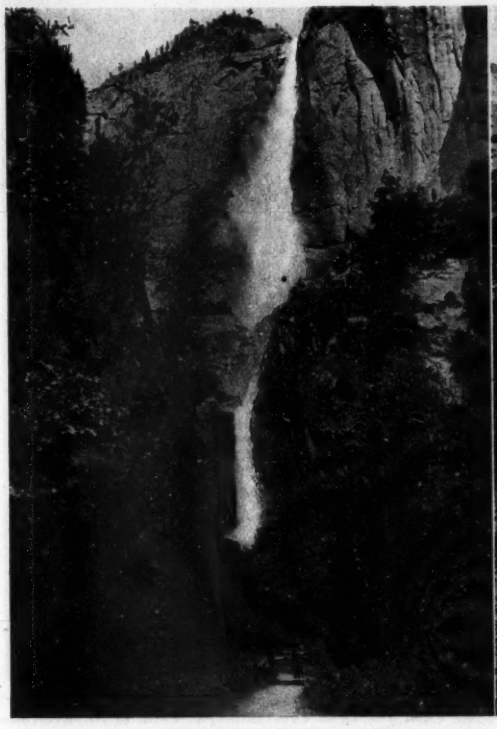
Labor-saving machinery is revolutionizing American mining methods—undercutting with compressed air pumps

Bureau of Mines, Washington, D. C.

Coal cutting machine with guard fitted to it in one of the mines of the H. C. Frick Coke Co.

Bureau of Mines, Washington, D. C.

Picturesque Views Around the World



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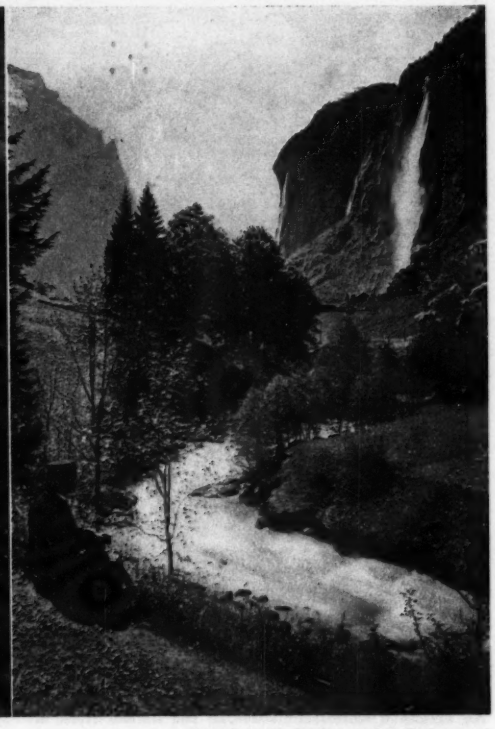
The Yosemite Falls—perhaps the most famous view in the wonderful Yosemite Valley



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The Staublack waterfall in the Lauterbrunnen Valley, in picturesque Switzerland

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In the picturesque floating gardens of Santa Anita, near Mexico City

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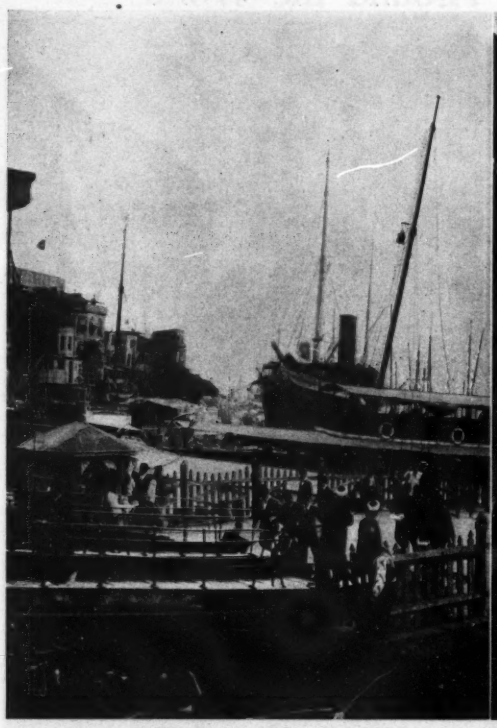
The fodder market on the lake shore at Maracaibo, Venezuela



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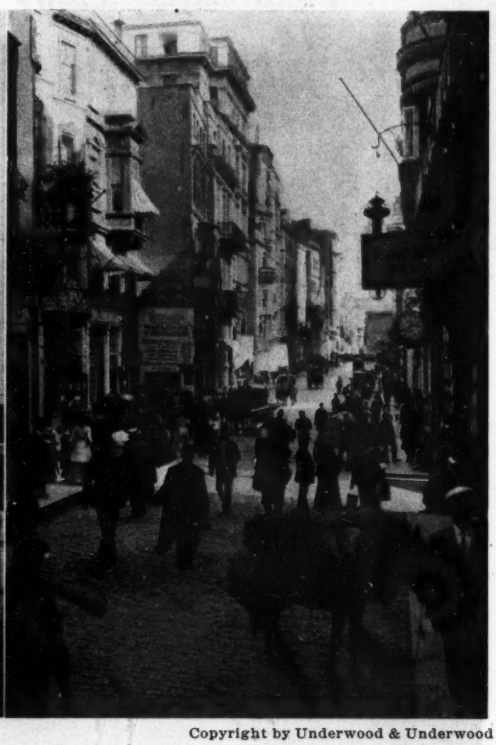
An animated waterfront scene on the Golden Horn at Constantinople, Turkey



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The Fifth Avenue of Constantinople, Pera, in the wealthiest quarter of the city

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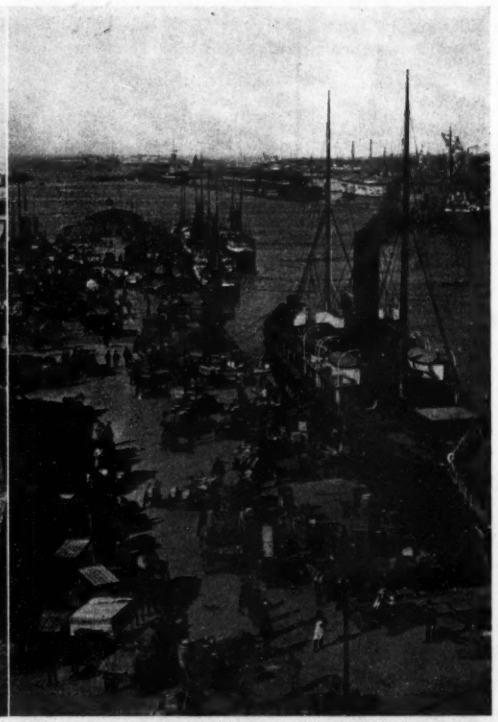
Peasants doing their weekly shopping in the market place at Viborg, Finland



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A corner of the busy harbor of Copenhagen, the metropolis of Denmark

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Isezaticho—the Bowery or Coney Island of Yokohama, Japan

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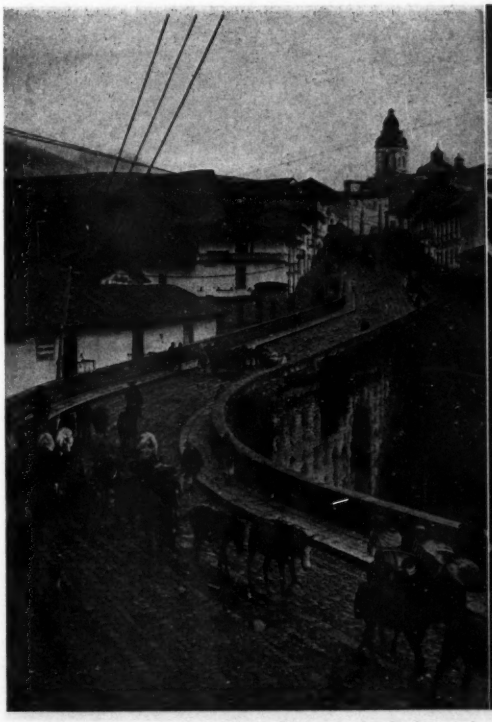
The superb snow-capped summit of Mount Fuji, 12,365 feet high, mirrored in the water of Lake Shoji



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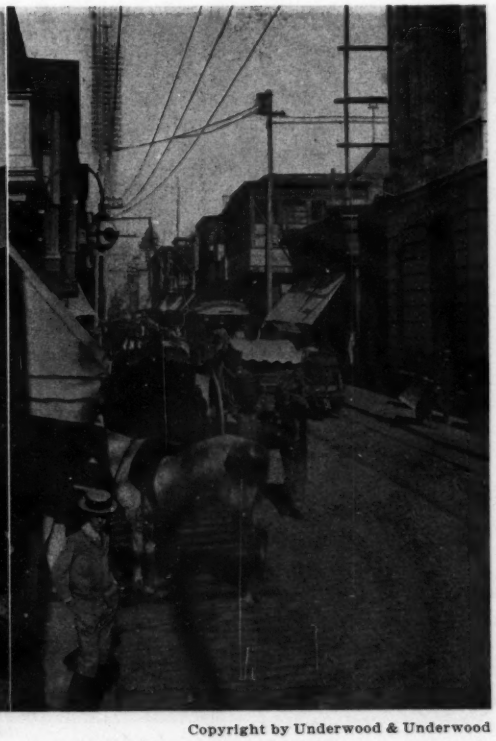
The ancient highway of the Incas running through the city of Quito, Ecuador



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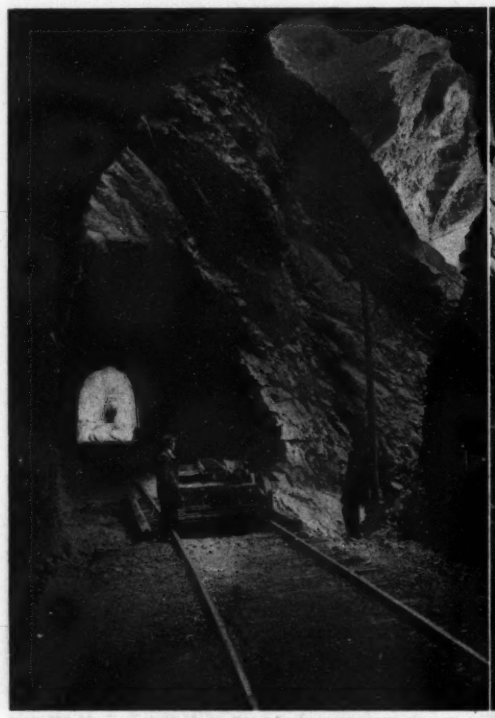
Calle de Huallago, one of the fashionable shopping streets of Lima, Peru



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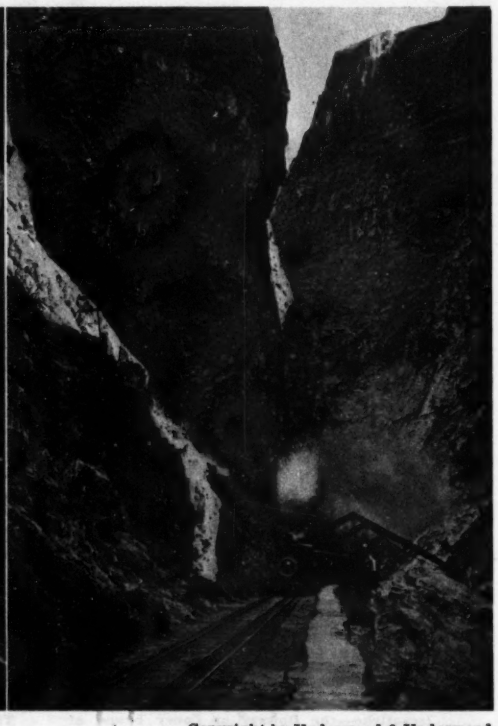
The tunnel of Cuesta Blanca, on the famous Oroya Railway in Peru



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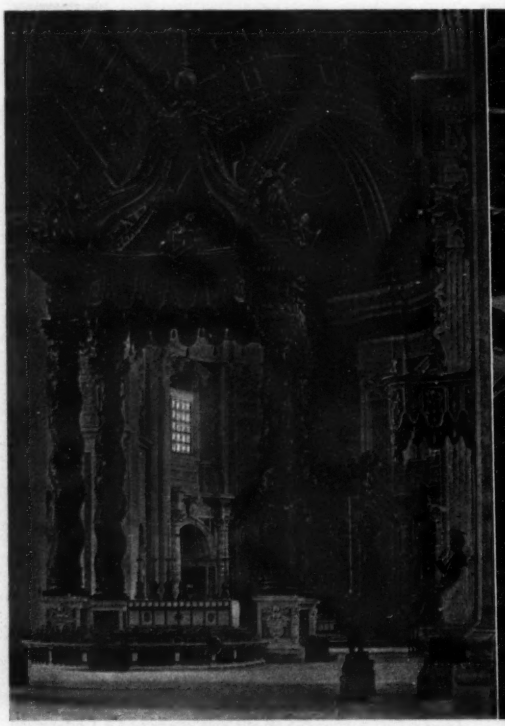
Royal Gorge, where a hanging bridge carries the railway over the Arkansas River canyon, Colorado



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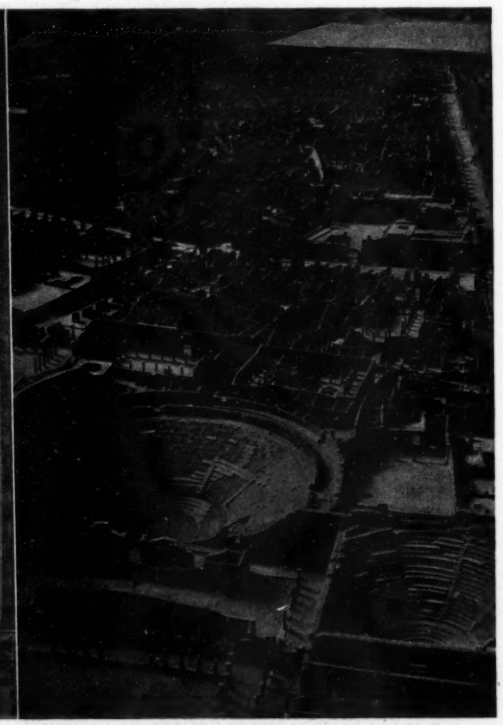
The great altar, 95 feet high, in St. Peter's Cathedral at Rome



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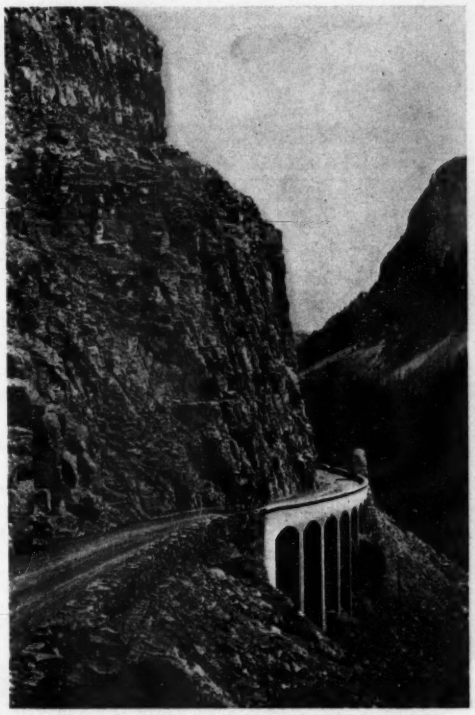
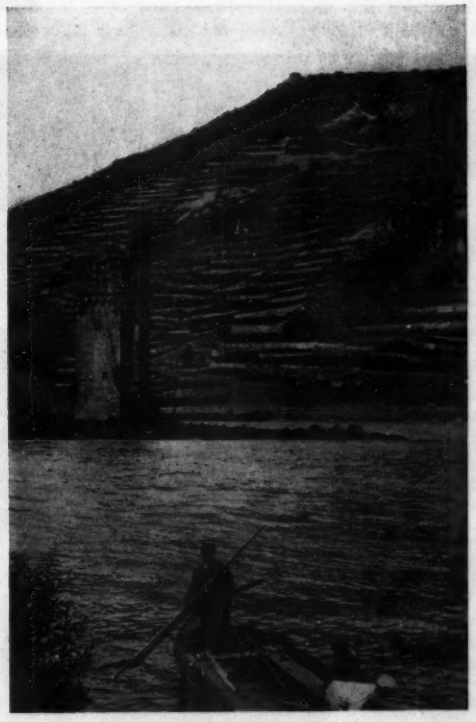
A bird's-eye view of a portion of the excavations at the ancient city of Pompeii



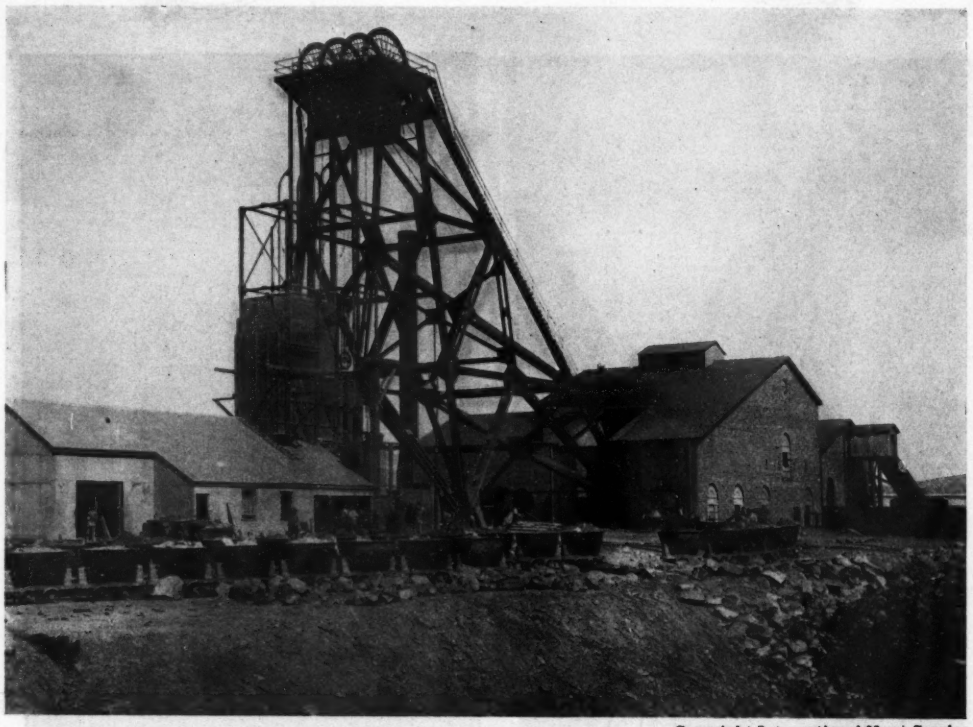
The Golden Gate entrance to the picturesque Golden Rock Ravine, Yellowstone Park

Muir Woods, Mount Tamalpais, California, where giant redwoods grow 300 feet high

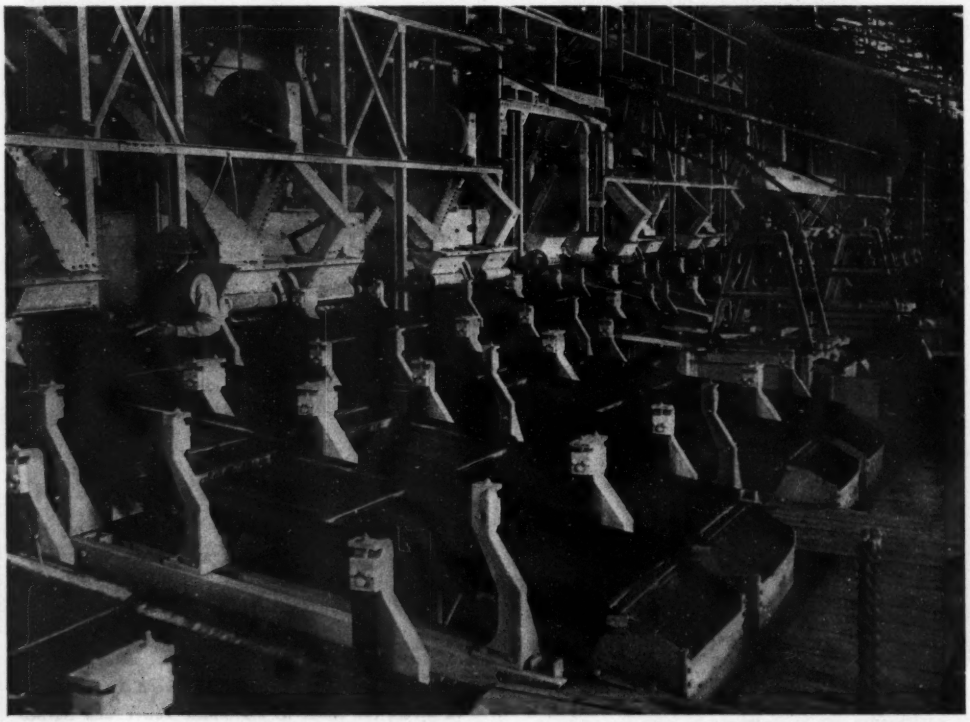
A skyscraper in India—the Garangapany Temple, twelve stories high



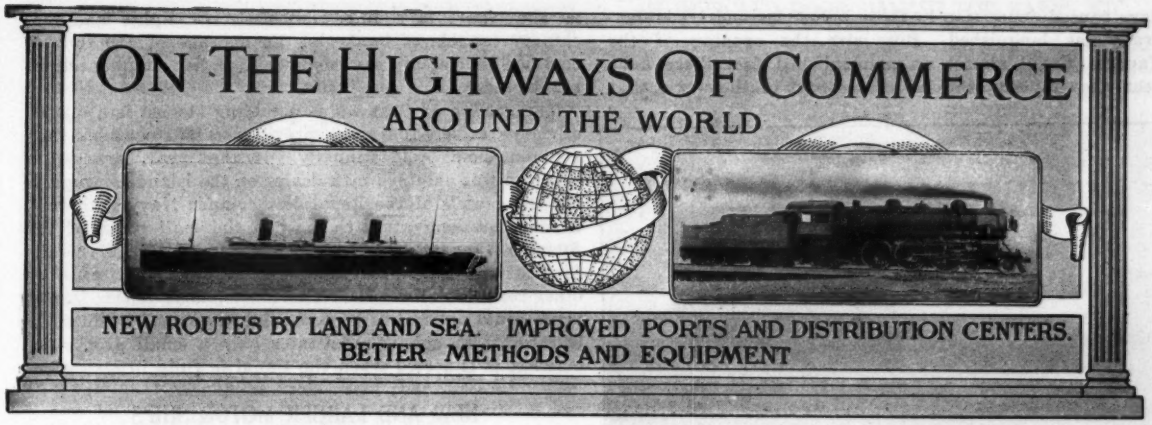
Looking across the Rhine at the Mouse Tower and terrace vineyards of Rüdesheim and Ehrenfels



The pithead of the Bultfontein mine in the De Beers diamond field at Kimberley, South Africa, the largest diamond producing region in the world



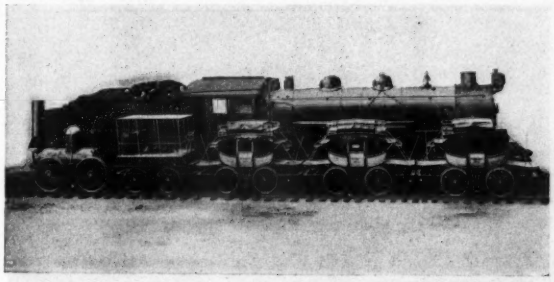
Pulsator grease tables to which the diamonds stick, while earth and other stones are washed away—in the De Beers diamond mines



CONTRASTS IN RAILWAY TRAVEL

The Gigantic Steam and Electric Locomotives of To-day Haul Trains that the Engines of a Decade Ago Could not Start

THERE are few lines of human achievement in which the progress that has been made during the last century is more striking than that of railroad transportation. The contrast between the sailing vessels of olden times and the great ocean liners of to-day is no greater than that between the first steam railroad locomotive run near Albany, in the State of New York, and the huge Pacific type of passenger locomotive now in service on the New York Central Lines, and running over the same route as that traversed by the pioneer engine of 1831. The accompanying illustration shows the "DeWitt Clinton," with its original train of three coaches, standing beside the locomotive that now draws the Twentieth Century Limited from New York to Chicago.



Courtesy New York Central Lines.

The "De Witt Clinton" and train of three coaches standing beside a Pacific type locomotive

The earlier engine was capable of a maximum speed of fifteen miles an hour and the total weight of the engine and tender was about six tons. Its four driving wheels were four feet, six inches in diameter; the cylinders five and one-half inches in diameter, with a 16-inch stroke. The fuel used was dry pitch pine and the engineer gave the signal for starting by blowing a tin horn. As there was no spark arrester on the stack, the smoke and sparks poured back on the passengers in such volume that they raised their umbrellas as shields. The covers were soon burned off of these, and each passenger had to whip his neighbor's clothes to put out the fires started by the hot cinders. This trial trip was run between Albany and Schenectady.

The Pacific type Class K3D locomotive now in use, an illustration of which is shown in the small insert at the top of this page, has a total length for engine and tender of 77 feet, 4½ inches; maximum height 15 feet; cylinders 23½ inches in diameter, with 26 inches stroke; driving wheel 79 inches in diameter, and total weight of 422,000 pounds, or 211 tons, with tender loaded. The engine alone is 47 feet, 7½ inches long and weighs 269,000 pounds. The great increase in the weight of the coaches and Pullman cars that make up the high-class American express trains of to-day has necessitated a remarkable increase in the size and strength of the locomotives as compared with those in use as recently as 20 years ago. The once famous "999" locomotive, exhibited by the New York Central Lines at the World's Fair in Chicago in 1893, which had a record of ten miles at a speed of 112½ miles an hour, would hardly be able to start a train like the Twentieth Century Limited, made up of eight or ten heavy Pullman cars, which the Pacific type of locomotive now hauls at a sustained speed of 60 miles an hour.

For a distance of about 34 miles from New York City the New York Central Lines operate their trains by electricity, one of the large electric locomotives used in this service being illustrated herewith. As there are over 700 trains arriving and departing at the Grand Central Station daily, electrical operation greatly facilitated rapid handling, and it is stated that throughout the period of an entire year the terminal delay at this station has averaged only 12 seconds per train. The electric locomotives used to haul the heavy express trains are mammoth affairs, being 55 feet 2 inches long, 14 feet 6 inches high and weighing 115 tons. The normal rated capacity of these electric locomotives is 1,800 horsepower, but while accelerating they will develop the enormous energy of 4,000 horsepower for short periods. They are capable of hauling a 1,000-ton train at a speed of 60 miles per hour.

Courtesy New York Central Lines.

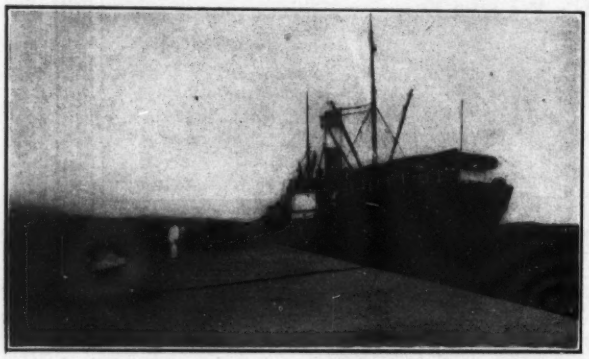
Train drawn by a 2,000 H. P. electric locomotive, near the Grand Central Terminal, New York

A NEW COALING STATION AT CURACAO

This Island, in Common with Other West Indian Ports, Preparing for the Opening of the Panama Canal

CURAÇAO, which is an island belonging to Holland, located in the Caribbean Sea opposite the north coast of Venezuela and embracing an area of about 212 square miles, was at one time of considerable commercial importance, because of its large production of sugar, tobacco and other tropical crops. During recent years, however, as in numerous other West Indian islands, various conditions

have caused depression in these industries and trade generally has languished. But with the opening of the Panama Canal almost an accomplished fact there have been growing expectations in this part of the world that a tremendous revival in business activity will be witnessed, and preparations are being made on a generous scale to meet whatever requirements that may be developed by the anticipated expansion in commerce.



Courtesy Shipping Illustrated.

The steamer "Sif" discharging the first cargo of Virginia coal at the Juliana Wharf, Curaçao

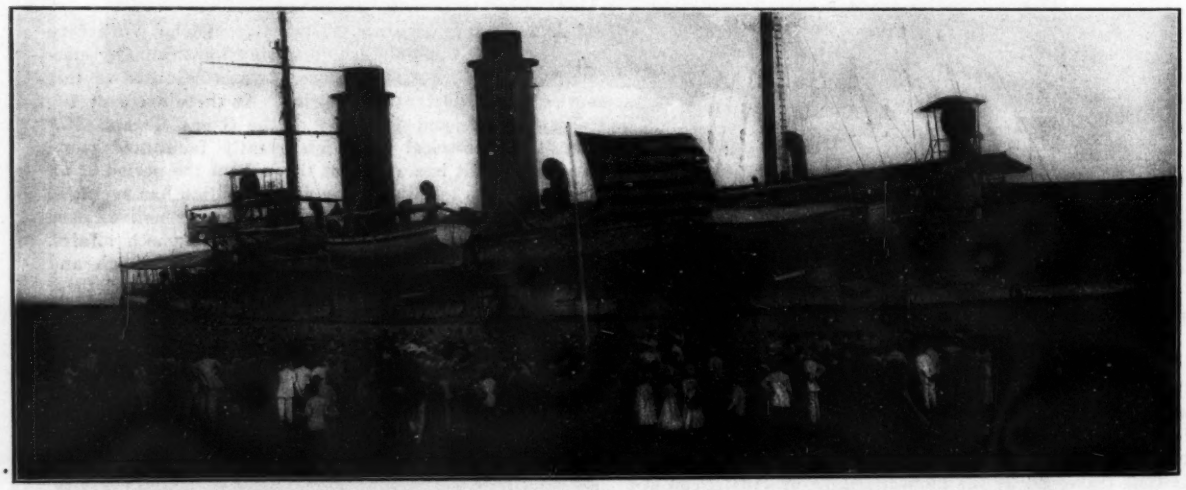
One of the most promising enterprises that has yet been inaugurated is the equipment of the coaling station that has been established at Curaçao, with the most modern machinery and other facilities for the rapid loading with coal any steamers that may find it convenient or necessary to replenish their supplies of fuel at that port. The harbor is considered one of the safest in the West Indies. It is seldom visited by hurricanes, and is situated close to the route taken by vessels plying between the Panama Canal and Europe, and between points in South America and in the Gulf of Mexico.

The accompanying illustration shows the Dutch cruiser *Zeeland*, moored alongside the new Juliana Wharf for bunkering purposes, this being the first vessel that was loaded at that wharf. The location of this wharf is one of the most favorable in the port, being situated so that the largest ships can maneuver with the greatest ease and having a depth of water alongside at low tide of 30 feet. It is constructed of re-inforced concrete, is 530 feet in length and 300 feet wide, with ample room to extend it to 1,500 feet whenever desired. Large supplies of the best American steam coal are kept constantly on hand, and as the wharf is equipped with electric lights and machinery capable of bunkering an average of 150 tons of coal per hour a ship can easily take on her supplies, either night or day, in a few hours.

The growth of Curaçao as a coaling station is a matter of comparatively few years, previous to 1901 not more than 200 tons being sold annually. In that year, however, a contract was obtained by a dealer on the island for supplying the vessels of the Royal Netherlands Navy with coal. It was not long after that when the mail boats of the Spanish Transatlantic Line began to make regular calls for coal and water, and similar action was soon taken by other commercial vessels. The development of this line of trade could not fail to be beneficial to general business in Curaçao, although it constitutes only a small proportion of what is expected when the Canal is fully in operation.

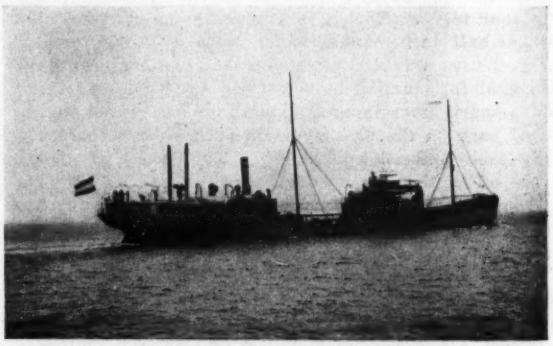
NEW AND LARGER MOTOR SHIPS

ONE of the most marked tendencies of the times in maritime construction and operation is the increasing use of ships operated by internal combustion engines. The accompanying illustration shows the motor ship *Wotan*, which was one of the first large vessels to be equipped with a Diesel engine. The photograph was taken in New York Harbor. The ship is 404 feet in length; 52 feet, 2 inches beam and draws 23 feet when loaded. It is equipped with a 2,000-B.H.P., 2-cycle Diesel motor, burning the cheapest grade of fuel oil. The *Wotan* carries 6,780 tons of oil, in addition to 900 tons of bunker oil and 100 tons of water. She has only a single screw, which in itself is a noteworthy illustration of the confidence already placed in this type of motor for large vessels.

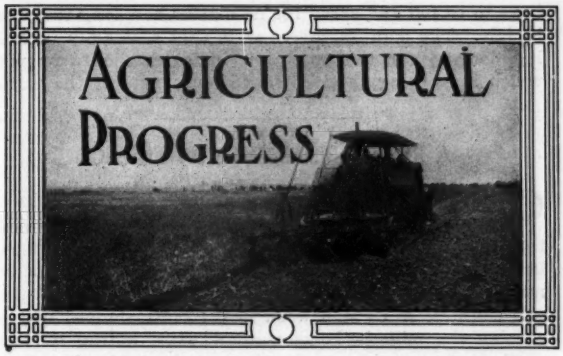


Courtesy Shipping Illustrated.

The Dutch cruiser "Zeeland," the first vessel to moor alongside the Juliana Wharf at Curaçao for bunkering purposes, during a visit by the Governor of the Colony



Tank steamer "Wotan," one of the first large vessels to be equipped with a Diesel motor



CLEARING BRUSH WITH A TRACTION ENGINE

A Branch of Farm Work in which Tractors are Far Superior to Horses

THERE are few farmers who do not dread the labor involved in reclaiming a field that has been neglected for a few years and allowed to be over-run with weeds, brush and small trees, for even with the best of horses and the heaviest of plows the work is very severe, both for the man and the team. But with the assistance of a modern traction engine the work can be accomplished with surprising ease and speed. There is no jumping of the plow, when it strikes a heavy root or other obstruction, and the results are better than when horses are used.

International Harvester Co.

A 60-horsepower Mogul kerosene tractor pulling a 12-bottom disc plow through a heavy growth of horse weeds

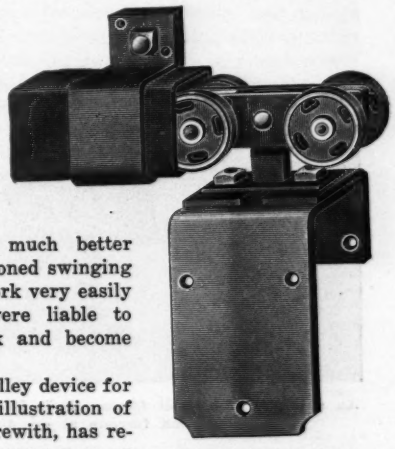
An excellent example of the difference between an engine and horses is given in the accompanying illustration which shows a twelve-bottom disc gang turning under a particularly heavy crop of horse weeds, a plant with extremely long, tough roots, and one that is considered most difficult to plow with horses. The tractor is a 60-horsepower Mogul type, using kerosene for fuel and, as can be seen, the ten-foot strip which is being turned is left in excellent condition.

The use of machinery—or power farming as it is termed—is rapidly increasing in all parts of the world, as agriculturists realize more fully the economy that can be effected by its assistance and that the profitable operation of a farm or plantation depends more and more upon economy and efficiency in the use of tools and time. There is a rapidly growing tendency to regard the farm as a species of factory, and to employ machinery wherever possible, just as is done in every modern industrial establishment. According to estimates obtained by experts the development of one-horsepower from horses costs sixteen cents per hour, while from a traction engine it can be obtained at a third of that amount. With such results before him it is no wonder that the up-to-date farmer or planter is readily adopting whatever machinery is suitable for his use.

Readers interested in any of the articles here described may obtain catalogues and prices by addressing SERVICE DEPARTMENT, DUN'S REVIEW, 290 *Broadway, New York, U. S. A.*

AN IMPROVED DOOR HANGER FOR BARNS, ETC.

AT one time practically all farmers experienced difficulty in keeping the large doors of their barns and similar buildings in good condition, the strap hinges generally in use being unable to support their weight and prevent them from sagging. In addition they were inconvenient to open and were frequently damaged by the wind. The first improvement consisted of the sliding type of door which hung from wheels operating upon a track attached to the side of the building over the door opening. While this was much better than the old-fashioned swinging door, it did not work very easily as the wheels were liable to run off the track and become jammed.



Trolley barn door hanger, with enclosed track

An improved trolley device for sliding doors, an illustration of which is given herewith, has recently made its appearance on the market and apparently eliminates every objection of this nature. As can be seen the wheels run in a square tube having a slot in the bottom, so shaped that it is impossible for them to jam or become untracked, and being entirely covered they cannot be interfered with by the entrance of foreign material. The arrangement of the suspension belt is such that the height of the door can be regulated without moving the track, while the clevis is hinged so that the door can swing out at the bottom. The track tube can be obtained with either hangers or brackets, so that it can be attached to the side of the building or to ceiling supports. The new hanger is said to be extremely strong and durable, to operate very easily and to be in every respect an immense improvement over anything of a similar nature that has yet made its appearance.

Richards-Wilcox Mfg. Co.

Garage or stable door showing an advantage of trolley door hanger where front is limited

This device is also very well adapted for garages, docks, freight warehouses and other places where the door to the carriage or truck entrance has to be opened and closed frequently. The larger illustration on this page shows a somewhat novel feature, namely, the use of ball-bearing hangers where right angle doors have been rendered necessary through lack of frontage room.

A TRACTION PLOW FOR SMALL FARMS

THERE are probably few farmers who have not read or heard of the wonderful economies effected in recent years by use of the traction engine, and many of them have doubtless thought that they would like to possess one.

An auto-plow for small farms. It is here cutting three deep, clean furrows at one time

This, of course, in the majority of instances is an impossibility, for apart from the expense, they can be operated with profit only on very large farms. There has, however, been recently introduced a small, moderately-priced auto-plow, designed especially for use on farms whose size does not warrant the purchase of an expensive traction engine. The new machine can be operated and cared for by one man, and, while naturally not capable of doing as much work as the larger engine, will easily take the place of eight horses and from two to three men.

The auto-plow will pull a three-bottom plow through all kinds of soil, up hill, down hill or on the level, much more rapidly than could be done with a four-horse team, and at about one-fourth the cost. It will also drag a seed drill, harrow, thresher or reaper, and when not needed for these purposes can be used for wood sawing, feed grinding, ensilage cutting or any other purpose for which power may be required. Those who have become familiar with the new machine are enthusiastic in their praise, one great advantage pointed out being the fact that it seems especially adapted for those farmers who have a large amount of plowing, cultivating, harvesting, etc., to be done

A guide wheel running in the last furrow cut makes the furrows truer than with horses

within a short period. The auto-plow does away with the necessity of keeping a number of horses or other draft animals that can be used only a portion of the time. It costs nothing when it is not working, while the animals have to be fed and cared for no matter how long they may be idle. The manufacturers state that a steadily increasing demand for the auto-plow indicates the favor with which it is being received in various parts of the world.

A PROFITABLE FARM CONVENIENCE

ONE of the most tedious and time-consuming tasks on the average farm is undoubtedly the separation of the cream from the milk in preparation for the making of butter. This is mainly because only a comparatively small number of farmers possess a mechanical cream separator, and continue to do this work in the old-fashioned way of putting the milk in large shallow pans, letting it stand until the cream rises to the top and then skimming it off with a wooden scoop or large spoon, a method which is not only very slow but also extremely wasteful. It may be that some farmers who possess only one or two cows and make only sufficient butter for their own use are under the impression that a cream separator will not pay unless a large number of cows are kept and the butter-making is conducted on a large scale. Such an impression is most erroneous, for even with a single cow one of these machines will be found a source of great profit and convenience.

A separator for the farmer keeping 2 or 3 cows

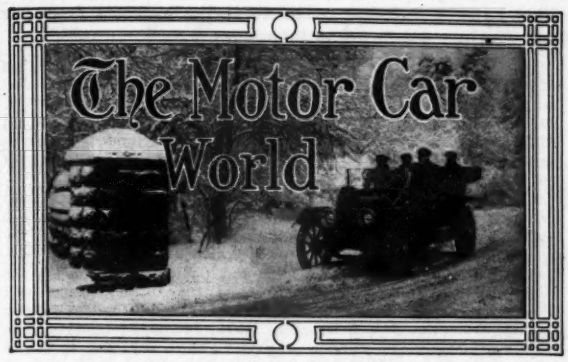
Originally the purchase of a separator was warranted only for use on large farms, dairies and commercial creameries, as they were made in sizes that were unsuitable for caring for the milk of one or two cows, but there is now on the market a small, very moderate-priced machine, operated by hand, that fills every requirement of the farmer who makes only enough butter for his own use. With one of these separators it takes but a few minutes to extract the cream from four or five gallons of milk, and the great advantage is that considerably more cream is obtained than if the work is done by hand, to say nothing of the amount of time and labor saved and the fact that the cream will contain no milk. Besides this, the quality of the butter that is made from cream extracted by a separator will be much superior, as none of the milk will be present to affect its flavor. Though these machines are small and cost but little, they are very substantially built, contain few parts, and are not liable to get out of order.

SOME IMPROVED WIRE STRETCHERS

THE most imperative requirement for the proper erection of wire fence, either barbed or plain, is undoubtedly an efficient wire stretcher, for unless the tension on every strand is approximately the same, the strain on the posts is unequal, which causes them to sag and the wires to become loose, thus shortening the life of the fence and detracting from its appearance. Many contrivances have been produced for doing this work, but most of them give anything but satisfactory service.

There are, however, a number of devices on the market, very simple in design, light in weight—none of them weighing more than about five pounds—and extremely moderate in price, yet giving such excellent service that no person who has even a short length of wire fence to erect can afford to be without one.

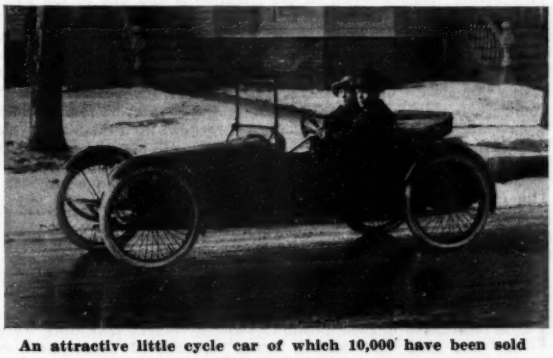
While most of these stretchers obtain their power by means of a lever, in one of them the principle of the windlass has been adopted, but no matter which one may be selected by the buyer it will be found to do the work for which it is designed in a most satisfactory manner.



GROWING POPULARITY OF THE CYCLE-CAR

Moderate Price, Low Cost of Operation and Easy Handling the Factors Stimulating Demand

THERE has been a steady advance of late in the esteem with which the cycle-car is held by the general public, the notable improvements that have recently been incorporated in its construction, its reliability, and the excellent service it gives, rendering it an increasingly serious competitor of the more expensive vehicles. There has always been considerable effort expended on the part of various manufacturers and inventors to produce a cycle-car that could be sold at a moderate price and that would give approximately the same service as a motor car of the runabout type, but it was not until within the past two or three years that these endeavors have met with entire success. In fact, it was not until the designers of the cycle-car began to follow the general lines of the larger vehicles that they met with much encouragement, and the latest productions, which are occupying an important position in public favor are in almost every respect, except size and weight, replicas of the lower-priced automobiles.



An attractive little cycle car of which 10,000 have been sold the past year

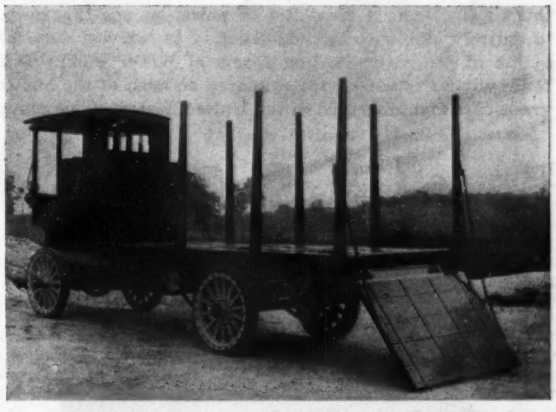
While some of these cars have two seats arranged one ahead of the other in tandem fashion, most of them, and the more popular types, have the seats side by side. The specifications of one of the latest models read very much the same as those of a runabout costing $1,000 or more. It has a four-cylinder air-cooled motor, force feed and splash oiling systems, Bosch magneto and Schebler carburetor, self-starter from the seat, sliding gear transmission with two speeds forward and one reverse; multiple disk clutch, underslung pressed steel frame, four half-eliptic steel springs, shaft drive through worm gear on rear shaft, left-hand drive, center control; irreversible steering gear, internal expanding brakes, three electric lights, sheet steel body, upholstered in black leather, and has seats for two persons side by side.

The best feature of these cars, and the one that has tended most to increase their popularity, is the low cost at which they can be operated and the simplicity of their design. As a rule they weigh between 500 and 600 pounds and are sold within a range of $350 to $450, which enables people of moderate means to purchase them. The range of speed of these little cars is ample for all requirements, being given as from 2 to 50 miles per hour, and as they will travel from 25 to 40 miles on one gallon of gasoline they can traverse a long distance at a very moderate cost. Another advantage possessed by the cycle-car is the comparatively light expense for tires and repairs and garage charges, the latter in numerous cases being entirely eliminated because the cycle-car can be kept in places where it would be impossible to put an automobile. The cars are made in a wide variety of styles and by many manufacturers, and the large number that are being sold in every part of the world indicates that there is an extensive field for these useful little vehicles.

Readers interested in any of the articles here described may obtain catalogues and prices by addressing SERVICE DEPARTMENT, DUN'S REVIEW, 290 *Broadway, New York, U. S. A.*

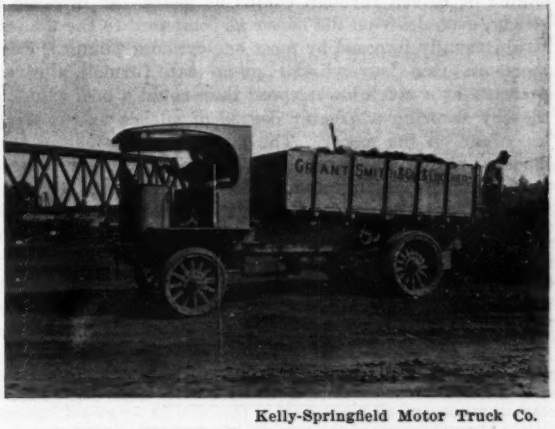
THE UBIQUITOUS MOTOR TRUCK

THE merits of the motor truck for delivery or transportation are becoming so generally conceded that there are to-day but few departments of industry in which they are not being used to a greater or less extent. Even in the old days when an ordinary wagon body had to serve for all purposes, their superiority over horses was quickly demonstrated, and now that the policy has been adopted by the manufacturers of studying the needs of each individual industry, and building bodies specially suitable for the different requirements, the replacing of animal power by the motor truck is proceeding with steadily increasing rapidity.



Lauth-Juergens Motor Car Co.

Special stake body intended for a lumber company, mounted on standard chassis



Kelly-Springfield Motor Truck Co.

Extra heavy dumping body for coal merchants, ore carriers, contractors, etc.

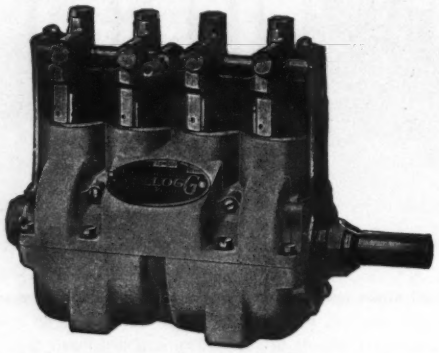
For instance, there is a large, lightly built body on a chassis of moderate power for manufacturers of boxes,

whose product, while not heavy, takes up considerable space. In contrast to this is the massive 5-ton truck, with patent hydraulic dump for dealers in coal, brick and building material. Then there is the large oil-tank truck for delivering kerosene, etc., to private customers, while still another that attracts considerable attention is the street railway repair truck with its miniature extension tower, on which the workman can stand in saftey at any desired height and repair the broken wires. Between these extremes there are special bodies for bakers, milkmen, breweries, bottlers, ice dealers, dairymen, farmers, contractors, lumber dealers, expressmen and, in fact, for every purpose for which a wagon can be used. Those who have adopted the new method of transportation find that not only is the auto truck a source of great economy, but, what is perhaps not less important, a remarkable saver of time.

PUMPING AUTOMOBILE TIRES BY POWER

INFLATING automobile tires by means of a hand pump is a very tiresome and lengthy task. For these reasons it is often shunned by motorists, with the result that the car is run on soft or flat tires, which are soon ruined through this negligence. But fortunately, the accessory manufacturer has again come to the aid of the motorist; this time offering a large line of power pumps that serve to entirely eliminate manual labor.

One of the many leading forms of power pumps is a four-cylinder type which is employed on most of the higher grade cars manufactured in the United States. This pump



A four-cylinder tire pump capable of delivering pressures up to 200 pounds per square inch

can be either directly connected to the crank shaft of the engine or driven through chains or gears. It involves a steady, even draw on the motor as compared to the uneven strain usually imposed by most one-cylinder pumps. Furthermore, this four-cylinder pump can furnish a given pressure at a much lower speed than could a one-cylinder, thereby securing a greater degree of silence and causing less wear on the motor. The pump is furnished in two models—air or water cooled. The former is the most used, being primarily intended for tire inflation. The latter has been designed for use in connection with compressed air self-starting systems and will readily deliver pressures up to 200 pounds per square inch. The water cooling system is connected to the usual water circulation system of the automobile engine. The tire inflation pump is regularly supplied with 15 feet of rubber tubing and a pressure gauge, so that any tire of a car can be conveniently reached and the progress of the inflation noted.

AMERICAN AUTOMOBILES IN SOUTH AMERICA

IN a recent issue of *Motoring in South Africa*, published at Capetown, there is a very interesting editorial analysis of the customs returns for motor car imports during the calendar year 1913, in which the editor traces briefly the remarkable growth in the motor car imports from the United States and Canada in the six years from 1908 to 1913 inclusive. The following extracts from the editorial are taken verbatim:

In 1908 the total car imports from the United States were valued at only £1,203. The following year they sprang to £16,675, and for the four years 1909-1912, their total value was £235,797, or 29 per cent. of the value of the cars imported from the United Kingdom for the quadrennial period. Last year's imports from the United States (£383,781) equalled approximately 81 per cent. of the value of imports from the United Kingdom (£436,903).

These figures for American cars do not include imports from Canada. But the Canadian car as we know it is essentially a United States product, and if we include the figures for Canada the position as between the British and "American" car may be summarized as follows: Imports from the United Kingdom for the years 1909-12, £808,009; imports from the United States and Canada, £318,808, or 38 per cent. of the United Kingdom figures. Imports from the United Kingdom, 1913, £436,903; imports from the United States and Canada, £540,959—23.75 per cent. in excess of the total for the United Kingdom.

As against the 1912 figures, imports from the United Kingdom have dropped from 53.75 per cent. of the total value of cars imported to 39.69 per cent. for 1913. American cars, on the other hand, have risen from 25 per cent. of the total imports in 1912 to 34.8 per cent. in 1913; and Canadian cars jumped from 8.7 to 14.28 per cent.; or taken together, to just over 49 per cent. of the total of £1,100,867, the declared value of car imports for last year.

BOOK REVIEWS

THE REPUBLIC OF COLOMBIA

THE invaluable South American Series has just been extended by the addition of a volume on Colombia * by Phanor James Eder. Like the other books in this series the aim of the present work is to present in brief compass the facts the average reader, and especially the business man, most needs to know. There is a brief chapter on geography—possibly too brief, for Colombia is a large country with a wide diversity of soil and climate—two chapters of history, and one devoted to international relations. Other chapters treat of government and law, finances and banking, railroads and transportation facilities, commerce, agriculture, and the mines and forests. The author then devotes three chapters to the principal geographical regions—two to the Cordilleras and one to the llanos and selvas. A final chapter treats of education. The book bears evidences throughout of careful preparation, and its pages relating to industrial and commercial conditions are very complete and satisfactory. It is the best book yet published regarding Colombia for those who desire only a single authority, or for business men or commercial travelers whose interest in the country is practical and whose time for research is small. There are 40 illustrations and two maps, one in colors at the end of the volume being especially good.

* *Colombia*, by Phanor James Eder A. B. LL. B. Published by Charles Scribner's Sons, New York. Price $3.00.

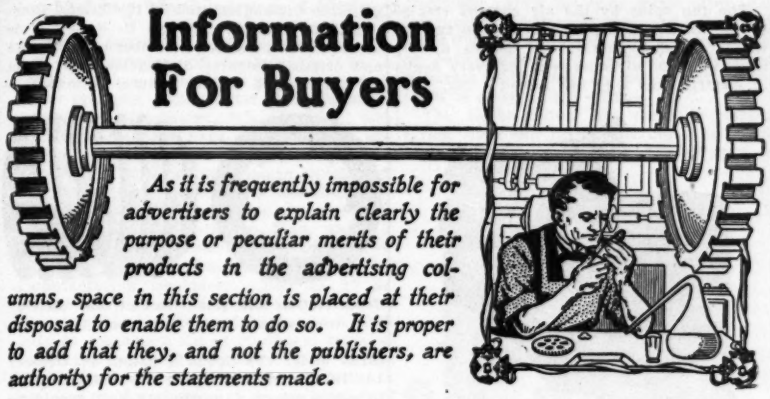
THE REAL SOUTH AFRICA

IT is sometimes a good thing to have a subject regarding which one has long had certain firmly established ideas discussed from an entirely new standpoint. This is what the author of *"The Real South Africa"* * has done and, while some of his statements are surprising, the fact that the Prime Minister of the colony has written the preface for the book indicates that they are well founded. In his chapter on Basutoland, "the Black Menace," the author presents some facts regarding the race problem in South Africa that are seldom placed before the public in so frank and clear a way. The book also describes labor conditions, local politics, the principal cities and industries and the more notable scenic features of the country in a most entertaining and instructive manner. Intending settlers, investors and traveling salesmen planning to visit this important colony will find the book well worth reading.

* *"The Real South Africa,"* by Ambrose Pratt; published by the Bobbs Merrill Company, Indianapolis, Indiana, U. S. A. Price $2.50 net.

A JAPANESE CONVERSATION BOOK

A NEW edition has just been issued of "Commercial Conversations," an English-Japanese conversation book first published some 25 years ago. The work has since been through several editions and has been constantly improved and enlarged, the publisher stating that the text of the present edition is 20 times the size of the first. This volume is one of a series of books on colloquial commercial English, of which three has thus far been issued. For copies address the publisher, G. Tomita, 455 Aoki-Machi, Yokohama, Japan.



Information For Buyers

As it is frequently impossible for advertisers to explain clearly the purpose or peculiar merits of their products in the advertising columns, space in this section is placed at their disposal to enable them to do so. It is proper to add that they, and not the publishers, are authority for the statements made.

Modern Road-Building Machinery

DIRECTORS of public works, municipal departments and contractors who are interested in the building and maintenance of good roads, whether of the ordinary type of earth or dirt roads or the more modern water or oil bound macadam or stone roads, should secure catalogues and prices from Messrs. Carr & Tyler, who are the export department of The American Road Machinery Company. This concern, which is among the most prominent in this industry in the United States, manufactures practically everything in the way of machinery used for building, repairing or keeping in perfect condition all kinds of roads, including a very complete line of steam and horse-driven road rollers, rock crushers of various capacities, road graders for use with horses, oxen or traction engines, and road oiling apparatus for spreading crude or asphaltic oils.

Fig. 1
"Little Winner" road machine for earth roads—can be drawn by 2 horses

Fig. 2
"Improved Steel Champion" reversible road machine for heavy work

Fig. 3
"Champion" steel reversible road roller—built in four sizes

The accompanying illustrations show a few of the productions of this concern and give an excellent idea of the wide range covered by the machinery described in the catalogue above referred to. Figure 1 shows the "Little Winner Road Machine," which is designed for use on earth or dirt roads and can be pulled by two horses or oxen. Where heavier work is to be done the "Improved Steel Champion Reversible Road Machine" shown in figure 2 is recommended. This machine requires from four to six horses or oxen, and as it is very strongly built, is not liable to be damaged when being used on stony ground. A larger and heavier machine for use by contractors and on very extensive operations is built to be used in connection with a traction engine. It is known as the "Jumbo Road Machine," and is considered by the makers to stand at the head of this class of machinery.

Figure 3 shows the "Champion Steel Reversible Road Roller," which is made in 2½, 3½, 4½ and 5½-ton sizes. No better machine of the kind for rolling and finishing a dirt or stone road can be obtained, and as only the best materials are used in its construction it is extremely durable. In addition to the above machines the company also manufacture an extensive variety of road drags and levelers.

When the building or repairing of stone or macadam roads is to be done the contractor or others engaged in this work will find a rock crushing plant a source of great economy. Attention is therefore called to figure 4, which shows the "Champion" rock crushing outfit, with complete mountings, elevator, screen and telescopic bin. This is a semi-portable plant intended for large or moderate sized operations, and can be moved from place to place, or used as a stationary plant without the mountings. The same crusher, with elevator and chute screen fully mounted for moving along the road is shown in figure 5. The Champion crusher is built in five sizes, the smallest having a capacity of 50 tons per day, and is being widely used by owners of haciendas and plantations, contractors and municipalities, and wherever road or concrete work is being done.

The steadily increasing custom of oiling the roads during the summer months as a means of extending their life and also laying the dust, has called for means by which this work can be quickly and cheaply accomplished. This demand has been very satisfactorily met by the "Monarch Oil Distributor," shown in figure 6—a moderate priced, but efficient and substantially built outfit. The foregoing comprise but a few of the equipments and specialties made by this firm for use in road building, and those desiring further particulars should write for a complete catalogue, which can be supplied in English, Spanish or French, addressing Messrs. Carr & Tyler, 50 Church Street, New York City, U. S. A.

Fig. 4
"Champion" rock crushing outfit with elevator, screen, etc.

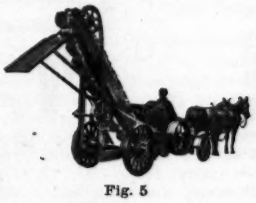


Fig. 5
Same crusher with elevator and chute screen mounted

Fig. 6
"Monarch" oil distributor for crude or asphaltic oils

A New Short Globe Lantern

A NEW addition to their already very extensive line of oil lanterns and other lighting accessories has recently been announced by the R. E. Dietz Company, of New York City, U. S. A. The new lantern, which is known as the "Wizard," is to a considerable extent a counterpart of their famous "Blizzard" cold blast lantern and embodies all the good features of construction of that popular type, the principal difference being that it is equipped with a short globe. It has an improved Dietz No. 2 burner, with rising cone and bottom globe lift, so that the wick can be very easily exposed for trimming, cleaning and lighting. The fount can be filled without removing the globe by unscrewing a cap on the outside, and the lantern can be exposed to the highest winds without danger of the light being extinguished. Each lantern is 13¼ inches in height, is provided with a 1-inch wick and is guaranteed to possess a 10-candle illuminating power. The accompanying illustration gives an excellent idea of the appearance of the new production, and at the same time shows the exposed wick tube and how easily the lantern can be cleaned and trimmed—an important factor if the maximum amount of light is desired. Those desiring further particulars regarding the Dietz line of lanterns can obtain literature in which they are fully described by writing the firm at the above address.

The new "Wizard" short globe lantern made by R. E. Dietz Co.

Fancy Groceries and Delicatessen

THE attention of large dealers in the better class of groceries and delicatessen and importers of fancy food products is called to the extensive line of these articles manufactured by the firm of Albertiny & Company, of Nice, France. This concern, which has been established for nearly fifty years, has acquired an enviable reputation for the quality and attractive appearance of their goods, and they state that wherever they have been introduced they have met with an immediate and steadily increasing demand, as a result of the superior flavor acquired from using only the best materials and ingredients and the most painstaking care in their preparation. In addition to the many kinds of groceries and fancy food products put up by this firm, they are also very large manufacturers of soup pastes and macaroni, which they state are held in high esteem by consumers in every part of the world. Correspondence is invited from department stores, importers and others interested in buying direct from the manufacturers, or from responsible parties in position to handle a quick selling and profitable line of products of this class. Those desiring circulars, prices, or other information, can obtain the same by communicating with the firm at the above address.

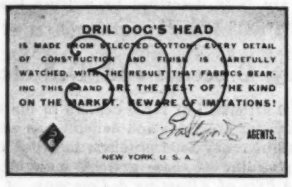
Fabrics for the Tropics and General Export

THE house of Stafford & Company, textile manufacturers, in further extending their export trade, are once more calling attention to some of their products. Among these are a number that, they state, have been made specially for the export trade and whose success abroad has been so great that it has become very necessary to warn buyers against imitations. One of the accompanying illustrations is shown, therefore, for the purpose of familiarizing the trade with the label of their most notable export product—the "Dog's Head Drill," which is claimed by the firm to be a line of drills peculiarly adapted

The "Dog's Head" label used on all "Dog's Head Drills"

to the trade in tropical and sub-tropical countries. It is said to wear unusualy well and to look very well, as well as to improve in washing. Both the label and the guaranty—shown in the second illustration—are printed in English, Spanish and French. The article sells at a staple price, thus enabling the foreign merchant not only to handle it with confidence and profit but, owing to the tested success of the line, to feel sure of giving satisfaction to his customers.

There are several other products among the firm's line offered to the export field, including their "Red Label 28" chambrays, especially designed for shirtings for working men, as well as for cheap dresses for women and children; "Black Cat" brown sheetings, in all weights and widths; and "American Jaganagh" (Elephant Brand), a cloth said to be


DRIL DOG'S HEAD

IS MADE FROM SELECTED COTTON, EVERY DETAIL OF CONSTRUCTION AND FINISH IS CAREFULLY WATCHED, WITH THE RESULT THAT FABRICS BEARING THIS BRAND ARE THE BEST OF THE KIND ON THE MARKET. BEWARE OF IMITATIONS!

Stafford & Co. AGENTS.

NEW YORK U. S. A.

Facsimile of guaranty given with all Stafford & Co.'s textile products

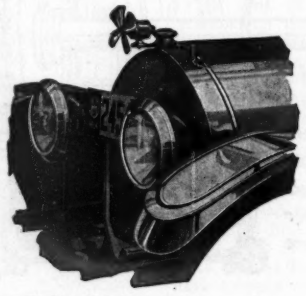
superior in appearance and durability to similar goods originally made in India.

The firm exercise great care in all departments—in producing, marketing, packing and shipping these fabrics. They will be glad to receive communications from the trade, addressed to G. A. Stafford & Company, 59 Worth Street, New York, N. Y., U. S. A.

Electric Fans and Small Motors

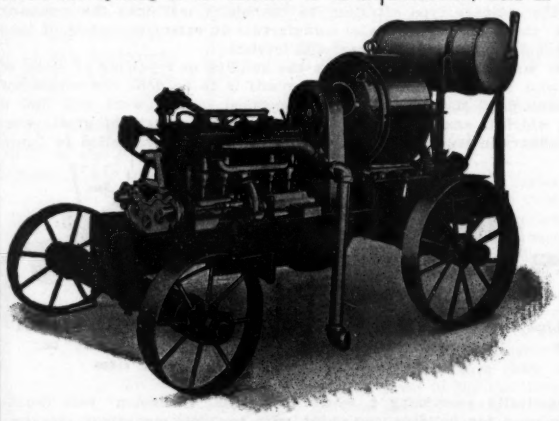
AS a feature of their advertising helps for electrical dealers, hardware merchants and others handling electric fans, the Robbins & Myers Company have just made up a small novelty fan which can be mounted on the radiator of a motor car, as shown by the accompanying illustration.

The fan spins by the air current created by the motion of the car, even when the latter is running slowly, and makes a very effective little advertisement for every dealer in electric fans who has a motor car. The



Novelty fan for the dealer's motor car—made by the Robbins & Myers Company

fan can be mounted directly on the cap which covers the opening to the radiator or on an iron strap which is clamped around the cap as shown in the illustration. The publicity department of the Robbins & Myers Company have many other helps for dealers which will greatly assist them in pushing the sale of this profitable and popular line.

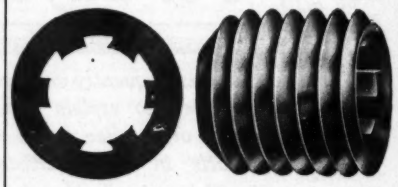


A portable generating equipment for illuminating amusement devices with Robbins & Myers generator

The larger illustration shown herewith represents a portable generating equipment for illuminating amusement devices, which consists of a "Standard" 115-volt, compound-wound, direct current generator, manufactured by the Robbins & Myers Company, mounted with gasoline engine on a steel frame truck. This is only one of many uses to which the small motors made by this company can be put, the firm stating that they are the largest manufacturers of small motors in the world. Their line of these consists of all sizes 1-60 to 15 h. p. direct current, and 1-60 to 1 h. p. alternating current. Handsomely illustrated catalogues describing both their line of electric fans and of small motors will be sent to any address on request. Address the Robbins & Myers Company, Springfield, Ohio, U. S. A.

An Improved Safety Set Screw

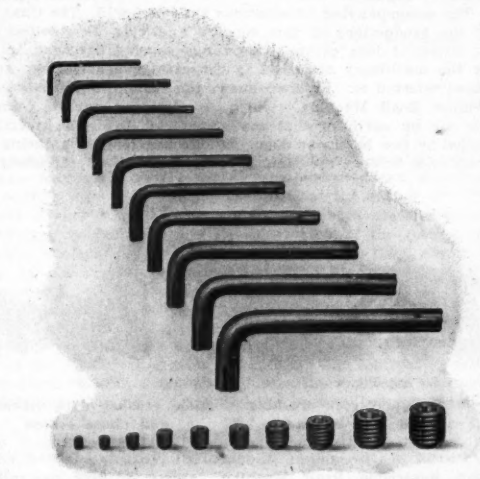
THE accompanying illustrations give an excellent idea of the design and method of operation of the "Bristo" patented safety set screws, manufactured by the Bristol Company, of Waterbury, Conn., U. S. A. This screw, which possesses a number of admirable and original features distinguishing it from all others of a similar nature, is manufac-



Cross section and side views of the "Bristo" patent safety set screw

tured under the Goodwin patent of October 14, 1913, and is designed especially for use in places where a protruding head would be either dangerous or objectionable for some other reason. In fact, so quickly were the merits of this screw recognized by the leaders in the "safety first" movement, that at the First International Exposition of Safety and Sanitation, held in New York City shortly after it was placed on the market, a silver medal was awarded to the manufacturers for their exhibit of safety set screws.

As can be seen in the cross-section view, these screws are turned by means of specially designed wrenches which fit into six dove-tailed slots in the hollow heads, so that the necessity for a protruding head is eliminated. Ample leverage is provided for tightening or loosening, without the liability of damaging the head as in the old-fashioned screws. This durability is resulting in the extensive use of these screws in places where they have to be taken out or set up or loosened and tightened frequently, such as lathe dogs and similar machinery, where many changes have to be made. The screws



"Bristo" set screw and wrenches in a variety of sizes. The screws have slots into which the wrenches fit

are treated with a special process, which makes the outside as hard as glass, while at the same time rendering the inside extremely tough.

The screws are made in a very large variety of sizes, and can be supplied to meet practically every requirement. For further particulars, prices, etc., address the manufacturers direct, as above.

Ice-Making Machinery and Fittings

EXPERIENCE having demonstrated the impracticability of incorporating in a single volume a satisfactory description of all their products, The Vilter Manufacturing Company, of Milwaukee, Wis., U. S. A., who are large manufacturers of ice-making machinery and supplies, have adopted the plan of issuing a series of bulletins in which each individual line is thoroughly described and illustrated. Among those that are now ready for distribution is Catalogue F-10, which is devoted entirely to ammonia fittings, used extensively in connection with artificial ice manufacturing machinery. Bulletin 10 describes the general construction of horizontal ice-making and refrigerating machines, Bulletin 11 contains a list of prominent concerns that have installed machinery made by the Vilter Manufacturing Company, Bulletin 12 contains a description of a moderate-sized plant for making can ice, Bulletin 14 gives directions for operating these plants, and will be found to contain information valuable even to the expert engineer. Bulletin 22-A is a treatise on the chemistry of raw water can ice, written by a leading specialist. Bulletin 16 is devoted to ammonia compressors, such as would be used by plants having a capacity ranging from 1 to 12½ tons in 24 hours. Prospective purchasers or others interested in artificial ice making or refrigerating machinery can obtain a full list of these bulletins and the subjects upon which they treat by writing the company, who will send those containing the information desired without charge to any address upon request, together with illustrated catalogues and export price list.

Germ-Proof Water Filters

IT is a universally recognized fact that there is no more important factor in the preservation of health than a plentiful supply of pure water, and to-day practically all the larger cities are investing vast sums in filtering plants in their efforts to provide their people with this necessity. There are many communities, however, without sufficient population to warrant the expense of installing a plant of this kind, and therefore those desiring assurance that the water at their disposal is not contaminated are compelled to adopt small individual filters. Numerous devices for this purpose have been produced, and while many of these possess some merit, it is claimed that none are more effective than the filter which is being offered under the name of "Noxall" Germ Proof Quick Flowing Water Filter, manufactured by the American Filter Company, 531 Market Street, Milwaukee, Wis., U. S. A.

The "Noxall Junior." Capacity, 5 gallons per hour

This filter does not depend upon the principle of removing the impurities in the water by passing it through pulverized charcoal, sand or similar substances, but uses as a filtering medium a porous natural stone through which, under a moderate pressure, the water percolates. The pores in this stone are so small that over 25,000 are contained in one square inch, and while there is only a comparatively slight obstruction to the water, the passage of any germs or other impurities is effectually prevented. In fact, in a report upon an analysis made by a leading bacteriologist, it is stated that in unfiltered water, apparently clear to the eye, there was found 280 bacteria to the cubic centimeter, while the same water after passing through a "Noxall" filter and being cultivated upon culture plates for 72 hours showed an entire absence of bacteria. The manufacturers claim that no more exacting test could be given to any filter.

The Noxall filters are made in various styles, sizes and prices, the stone being cut to the exact shape needed in the different designs. The Noxall Junior shown in the accompanying illustration, is a compact, inexpensive and very effective little filter, having a capacity of five gallons per hour, intended to be used in connection with an ordinary faucet. The casing and fittings are durably constructed of spun copper and cast brass, with the inside heavily tinned and the outside highly polished nickel. The No. 3 Noxall, which is also shown herewith, is of much greater capacity, and is recommended for use in offices, stores and large homes where a generous supply of filtered water is wanted without delay. From these the filters increase in size up to a capacity of 200 gallons per hour, the latter being considered an ideal filter for bottlers or factories requiring a large amount of pure water. In addition to the above the company makes a small filter that is highly recommended for the use of travelers. It comes packed in a small metal case and weighs only 12 ounces. Attached to a rubber hose it can be dropped into a stream or spring and a drink of absolutely pure water can be immediately obtained. Whatever impurities happen to be in the water are deposited on the outer surface of the stone and can be easily removed with a brush. Catalogues, prices and other particulars regarding these filters can be obtained by all interested parties who will write the company at the above address.

The "No. 3 Noxall" filter. Capacity, 20 gallons per hour

Toilet Specialties in Great Variety

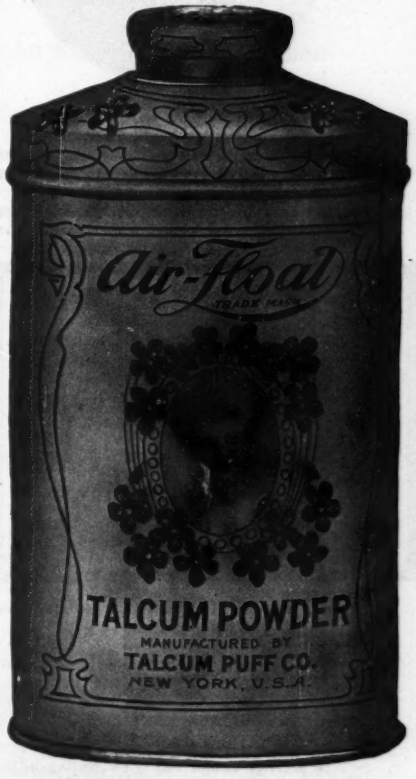
DRUGGISTS, general store keepers, dealers in women's goods and other merchants interested in toilet preparations of guaranteed quality will find it to their advantage to communicate with the Talcum Puff Company, No. 5 Bush Terminal Building, Brooklyn, N. Y., U. S. A., who are manufacturers of an extensive variety of soaps, perfumes, tooth pastes, tooth powders, cold creams, face powders, etc., all of which are very attractively put up and form a quick selling and profitable line of merchandise.

While this firm are large producers of the different articles mentioned above, they call particular attention to the superior quality possessed by their flesh powders, which are manufactured from high-grade talc obtained at their own mines in North Carolina. The finished article is marketed in various packages under the trade-mark "Air Float," derived from the interesting process through which the talc passes during the course of refining. Briefly, this process consists in grinding the rock after it is cleaned so finely that when agitated a considerable proportion will actually float in the air. These particles are drawn off by means of a current of air, while the heavier portions are reground and the process repeated. Then whatever perfume desired is added and the perfected powder packed in tins of various attractive designs.

The merits of talc as a face powder are becoming so generally recognized that it is rapidly superseding all forms of chalk and vegetable powders used for that purpose. It is hygienic, antiseptic, soothing and healing, while it imparts to the skin a smooth and velvety appearance and removes the gloss resulting from perspiration. The company announce that they can supply their "Air Float" face powder with any perfume desired by the purchaser, the strength of which will depend upon the price.

The Talcum Puff Company direct particular attention to the fact that they are not only manufacturers in the ordinary sense of the term, but own and operate their own mines, and are therefore in position to quote the lowest possible prices for their product. Furthermore, their location at the Bush Terminals, New York Harbor, enables them to ship their product at the lowest possible rates, as their export offices and warehouses are directly connected with the steamship piers.

The company publishes a number of interesting booklets describing their products, containing actual size reproductions of many of the packages in which they are put up, some of these being in colors. They also publish a very interesting little booklet entitled "Talcum Powder and Its Use." In addition to their various lines put up in sealed packages, the firm are also prepared to ship powdered talc in bulk, put up in bags weighing 220 pounds each, and can quote prices on either American, French or Italian talc in bags or in ton lots. For copies of this literature, together with export prices, address the manufacturers direct as above.



Can of "Air Float"—showing the manner in which this talc face powder is put up

THE Adams Bros. Company, of Findlay, Ohio, U. S. A., have just issued an interesting leaflet illustrating their Model A, 2,000-pound truck, Model D, 3,000-pound truck, and Model E, 4,000-pound truck. Under each illustration full specifications are given. Copies will be sent free on request.

High-Grade Band Instruments

THE accompanying illustrations represent one interior and one outside view of the Frank Holton & Company's band instrument plant at Chicago, Ill. This firm, which has been engaged for a period of fifteen years in the manufacture of high-grade brass wind musical instruments, music racks, instrument cases and accessories, has recently issued some very interesting literature in both Spanish and English, which the importer of these products will find of great value. The company is desirous of further extending its export trade and is prepared to grant advantageous terms to responsible agents in cities where the Holton products are as yet unrepresented.

**Mr. Frank Holton,
President Frank Holton & Co.**

The variety of the firm's instruments covers an unusually wide range. The cornets are offered in long, short and medium-sized models adapted for solo, band and string orchestra work. A notable example is the Holton special slide trombone, designed to meet the demand for low pitch instruments and instruments of high pitch that can be played in low. On the other hand, the Holton German symphony model slide trombone is made for use in symphony orchestras and other large organizations, and is therefore in low pitch, only with extra large volume. Various attachments accompany the different instruments. The cornets are furnished with a quick-change pitch device which is built as an integral part of some of the models, with two mouthpieces, piston wiper and an elegant case, besides a complete set of valve slides. Similarly, the Halloway attachment, consisting of a slight enlargement of the outer slides at the top, is of great assistance to trombonists, and is therefore furnished with the Holton special slide. Particular mention should also be made of the company's exceptionally complete line of basses, which contains no less than eleven different styles.

Factory of Frank Holton & Co., manufacturers of band instruments

An interior view in Frank Holton & Co.'s band instrument factory

The literature above mentioned will be sent to all who are interested on request. It includes complete catalogue, a price list furnishing necessary information regarding shipping terms, etc., a brief circular devoted to specialties, such as mutes, tuning bits, mouthpieces and the like, and a booklet on drums and traps entitled "Drumology." All inquiries should be addressed to Frank Holton & Company, Export Department, 2638 Gladys Avenue, Chicago, Ill., U. S. A.

Fine Vehicles for the Export Trade

AN unusually interesting catalogue, printed in Spanish and English and specially intended for the export trade, has just been issued by the Wilber H. Murray Manufacturing Company. It is very rarely indeed that a booklet presents the prospective buyer with so much necessary information in so clear and striking a way. The first half dozen pages contain a mass of valuable information, such as a table of ocean freight rates between New York and some 200 ports, full statements relative to cost, insurance, freight, manner of packing and how to order. Clearly printed prices and specifications are given under each vehicle or harness illustrated in the body of the catalogue. A most useful feature is the illustration on pages 10-11, indicating all the trade names of different parts of a vehicle.

The accompanying illustrations show two of the Murray products. The Cuban cab is black with striped moulding and green striped gear. It is provided with a leather top and is upholstered in genuine buffed leather throughout. It has a folding, adjustable seat in the rear of the dash, and a 38-inch seat in the rear of the cab. Both the Cuban cab and the cabriolet (shown in the other illustration) are well adapted for all tropical and semi-tropical countries. The cab has solid rubber tires, while the other has steel round edge tires. The cabriolet is upholstered in dark English broadcloth, except for the top, on which the quarters and back stays are of leather and the roof and curtains of waterproof rubber.

The catalogue will be sent to anyone addressing the Wilber H. Murray Manufacturing Company, 313 East 5th Street, Cincinnati, Ohio, U. S. A.

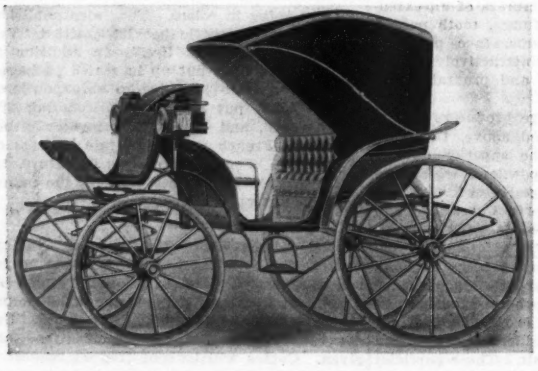
A Tourist Camera for Motion Picture Films

MESSRS. Herbert & Huesgen Company, 456 Fourth Avenue, New York, N. Y., U. S. A., desire to call attention to their new Tourist Multiple Camera and Projection Lantern, with which 750 individual pictures can be taken without reloading and then all of them shown on a screen in the order they were taken by little more than a touch of the finger. The camera is only 4x8x2½ inches in size, but it can carry 50 feet of standard perforated motion picture film. A special anastigmatic lens of microscopic sharpness and great rapidity, working at the speed of F. 3.5, is provided, so that snapshots can be taken in rapid succession. The body is a beautifully finished, cast aluminum box, so constructed that it is practically heat, cold and damp proof, which assures the preservation of the film and enables the owner to postpone the developing and printing until any convenient time.

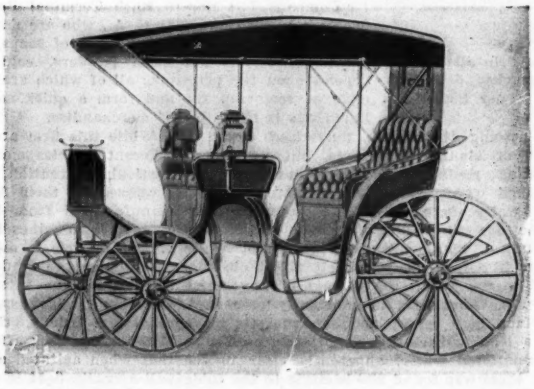
The pictures taken with this camera are so clear cut and sharp that enlargements can be made with perfect results. It is easy to carry, always ready to use and extremely simple to operate, both for oblong or upright pictures.

The distinctive feature of this outfit is the ability to reproduce on a screen at a very slight expense a series of events that may happen during vacation, when traveling, etc., which renders it especially suitable for hunters or campers, as a practical diary of everything interesting or exciting that may occur can be kept and afterwards form a

A Murray Cuban cab with folding adjustable seat in rear of dash—rear seat 37 inches wide



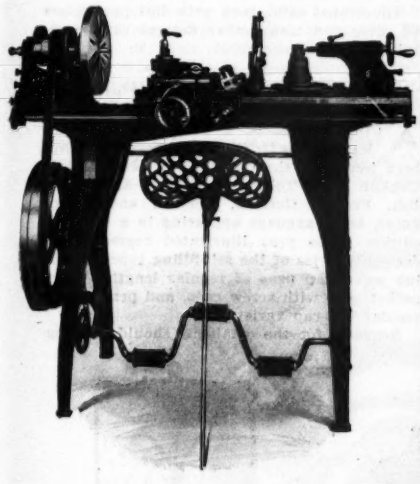
A Murray full platform standard cabriolet—can be supplied with servant's rumble seat in rear



source of entertainment by being thrown on a screen in the order they were taken. The lantern is of a new and improved design, very compactly constructed and fitted with a high-grade projection lens. Further particulars, prices and catalogues describing the method of operating these new photographic novelties, will be sent to any part of the world by the manufacturers on request.

A Moderate-Priced Screw Cutting Lathe

ONE of the latest productions of the W. F. & John Barnes Co., of Rockford, Ill., U. S. A., manufacturers of iron and woodworking machinery, is the moderate-priced but very efficient and substantially built gap lathe shown in the accompanying illustration. This lathe, which has an 11-15-inch swing, is arranged to be operated by either foot power or countershaft, and is made in one length of bed and one style only. It is of the screw cutting type and is provided with compound rest and offset tail stock, permitting the former to be set parallel with the bed. Spindles of both head and tail stocks are of the best quality steel, and are fitted as accurately as the largest and most expensive machines made by the firm. All working parts are thoroughly protected from dust



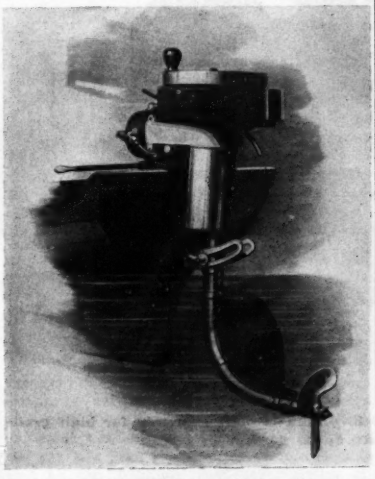
A substantially built screw cutting lathe that can be operated by foot power or countershaft

and dirt, which ensures long wear. The gearing furnished with this lathe can be so arranged that different leads of threads from 4 to 40 can be made, as well as a number of others not mentioned on the index plate. The dimensions of the machine are as follows: Swing over bed, 11 inches; swing over tool carriage, 6⅝ inches; swing in gap, 15 inches; width of gap (from face plate), 5 inches; distance between centers, 29 inches; hole through spindle, 15-32 inch in diameter; net weight, 500 pounds; weight boxed for shipment, 650 pounds. This lathe is especially recommended for use in shops having a moderate amount of light and medium weight work requiring speed and accuracy. It is fully guaranteed in every respect by the manufacturers, who will send full specifications and prices to any address upon application.

Noteworthy Products in Marine Engines

THE growing popularity of motor-boating has been responsible for the advent of the detachable gasoline engine, and the great demand for the oarless rowboat and the paddleless canoe has awakened manufacturers to the peculiar problems involved in the production of this species of motor. A little study of the situation has revealed the two salient factors upon which the success of the detachable marine engine depends. First of all, the builder has found the portable motor must be compact and light. The other equally important characteristic of a successful motor of this kind is mechanical simplicity without loss of efficiency.

It is because of its solution of these two problems that the latest detachable marine engine will command attention. Its total weight is fifty-two pounds. The manner in



A new Gray detachable marine motor weighing only 52 pounds complete

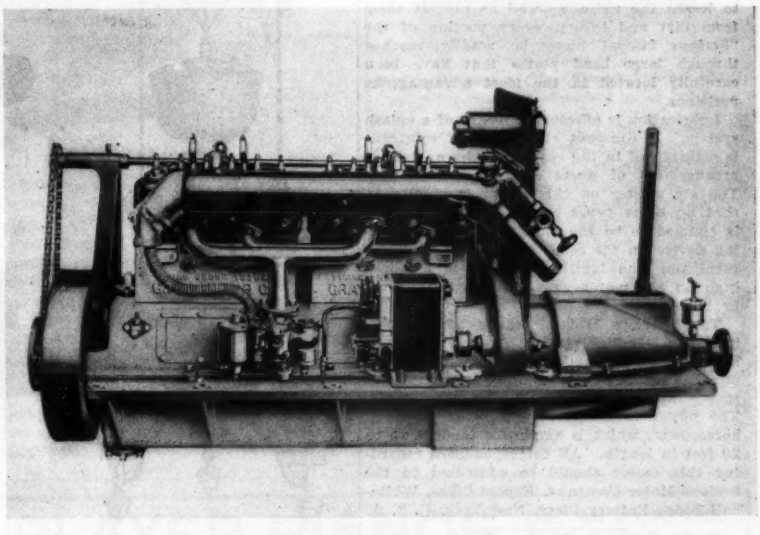
which this most desirable feat has been accomplished is interesting. A number of reforms were necessary. In the first place, by making a gearless motor, it was possible to eliminate the heavy, clumsy propeller hub that carries the bevel gear. Then, by a judicious choice of materials, the process of weight reduction was carried still further. Instead of common iron, vanadium steel has been employed in the fashioning of the shafts and drives. The crank case is made of that lightest of commercial metals—aluminum. The lightness of the motor is also to a great extent due to its simplicity, that is to say, to the small number of its parts. The most notable feature in this connection is the elimination of gears and valves. Absence of gears and the use of the universal drive insure against waste of power, because they improve the transmission.

From the same firm comes also a new six-cylinder model. Again compactness has been striven for and attained, chiefly by casting the motor *en bloc*, and as the manufacturer puts it, by building a "six" from the start instead of reconstructing a "four" by the addition of two new cylinders. A marine motor that is "born" a six has the greatest advantage over the built-up variety in that it is a six in all its parts, and particularly in the diameter of its crank-shafts. This new model, it is claimed, was built with an ideal; it was not brought into the market to meet a price, but rather to meet the need for as nearly perfect an engine as can be made. For this reason, every effort has been made to eliminate all the peculiar weaknesses of the marine motor, specifically excess of vibration, quick wearing of parts, and noise. Excess weight has been reduced, as in the case of the detachable, by utilizing aluminum as far as possible. Here the base, the sub-base, hand-hole plates, gear-housing and gear-cover are made of this metal.

Inquiries for further information regarding these two motors and for booklets illustrating and describing them should be addressed to the Gray Motor Company, 334 G. M. C. Building, Detroit, Mich., U. S. A.

An Export Buyer of German Goods

FOR over sixteen years Mr. Otto C. A. Hoffman, of Grossbeeren Str. 93, Berlin, Germany, has acted as local buyer of German merchandise for foreign mercantile houses importing goods from that country. He has represented many leading concerns in England, Canada, Holland, etc., and has made a specialty of purchasing supplies used by the confectionery trade. Mr. Hoffman states that his long experience in this line has given him an exact knowledge of market conditions and the various productions of the different manufacturers, so that he is always able to obtain the lowest quotations for the parties for whom he is acting. In addition to confectionery supplies, Mr. Hoffman will purchase such German goods as fancy leather and paper novelties, real and imitation bronzes, fancy glass and china ware, toys, etc. He gives close attention to every order, and business houses desiring to dispense with the expense of a personal visit or the maintenance of a buyer in the German markets may find it advantageous to correspond with him.

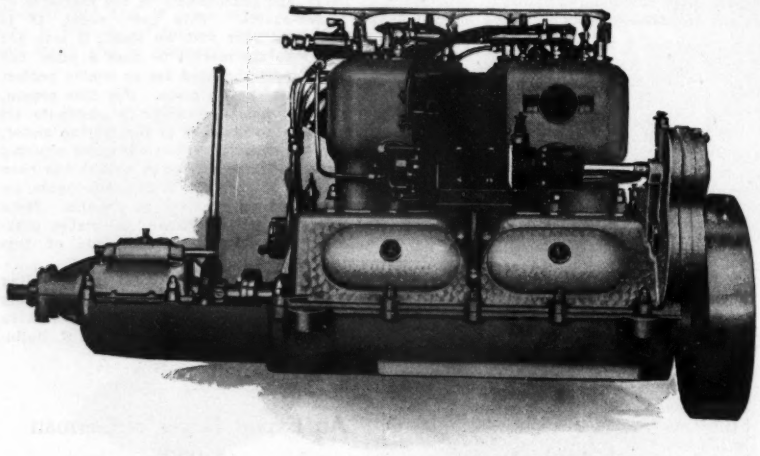


A new 6-cylinder model recently added to the Gray line of marine motors. The base, sub-base, hand-hold plates, gear housing and gear cover are made of aluminum

A Compact Marine Engine of Improved Design

OF no little interest is the new air-starting, four-cylinder motor with Bosch dual ignition, built expressly for high grade yacht tenders and similar craft by the Scripps Motor Company.

Like all Scripps engines, this compact motor—known as the "Scripps Midget"—is a complete and perfect power plant. The cylinders are finished in a deep cream color, highly enameled; the crank case is hand-scraped and has a frosted finish, and such minor fittings as the water pipes, starter valves, air compressor, etc., are highly polished and nickel plated, while the bolts and nuts are of special design with acorn heads.



New air-starting marine motor. It develops 7 h. p. and is built expressly for high grade yacht tenders and similar craft up to 20 feet in length

The L-head cylinders are cast in pairs, with enclosed valves which are of large area and small lift. These valves are operated by push rods of a modified mushroom type provided with adjustment nuts. The pistons have exceptionally long barrels, assuring long life and quiet operation. The timing gears are completely enclosed and rendered practically silent. It is interesting to note that in spite of the fact that all moving parts are enclosed to lessen the noise, as well as protect them from dirt and injury, every portion of the "Scripps Midget" may be readily reached through large head plates that have been carefully located in the most advantageous positions.

Lubrication is effected by means of a splash system. A constant circulation of lubricant is maintained in the crank case by an unique arrangement of ducts cast in the oil pan. The air starter on this motor is similar to that on other types of Scripps engines and is claimed to be the most efficient air starting device on the market. The magneto for furnishing the ignition current is mounted high on the motor so as not to be affected by bilge water.

The "Scripps Midget" has a bore of 2¾ inches by 3½-inch stroke. The normal speed is between 750 and 1,000 revolutions per minute, although the motor is capable of speeds up to 1,200 revolutions per minute. The power is conservatively rated at seven horsepower, which is ample for tenders up to 20 feet in length. All correspondence regarding this motor should be addressed to the Scripps Motor Company, Export Office, Whitehall Bldg., Battery Place, New York, U. S. A.

Incandescent Oil Lamps for Interior and Exterior Lighting

ONE of the drawbacks to the use of many incandescent oil gas-lighting systems has been the necessity for placing the tanks of the incandescent oil lamps under a certain artificial pressure by means of an air pump or carbonic acid. This process required a waiting period of about four minutes during the preliminary warming before the feed could be opened.

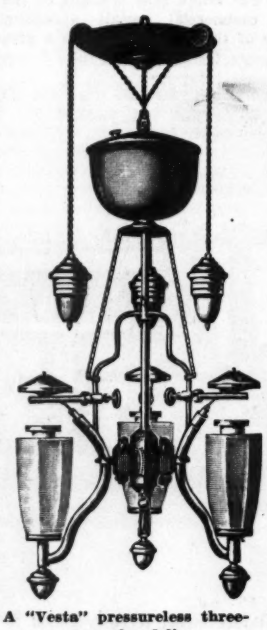
The loss of time and trouble experienced in this manner have now been obviated by the new "Autofax" and "Vesta" lamps of the Continental Licht und Apparatebau Gesellschaft m. b. H., of Frankfort am Main, Germany. In the "Autofax" lamp, which is a pressureless self-lighting type for exterior use, the oil container, like that of an ordinary lamp, is filled by pouring in the oil, which travels down to the vaporizer by its own weight with no artificial pressure whatever. On lighting, the feed cock can be opened immediately, whereupon the lamp ignites itself automatically without further attention.

To form a clear conception of the importance of the "Autofax" lamp, it must be borne in mind that until recently the street-lighting of a town of 30 lamps with air pressure required the attendance of at least three men for applying the necessary pressure. As each lamp demanded six minutes or more of attention, the three men, taking ten lamps each, consumed fully an hour in lighting the 30 lamps. With the use of the "Autofax" the attendant need neither pump nor wait during the preliminary warming. Instead of three men working an hour each, a single man can set the entire number of lamps in 30 minutes—about one-sixth of the former labor. The new construction thus not only simplifies the handling of the lamp, but also reduces the cost of operation, while the oil consumption amounts to only 8 ounces of kerosene per hour per lamp. The wear of incandescent mantles being always a large expense factor, the lamps, as a step toward greater economy, are fitted with "Continental" soft inverted mantles which are liable to no damage during shipment or when being installed. For putting out the light there is no need to lower the lamp, it being sufficient to pull down the lever.

Just as the Autofax lamps are designed for exterior illumination, the Vesta type are intended for indoor use. Working without artificial pressure, they produce no noise, smoke or smell in burning, which permits of their use for churches, schools, offices, etc. Their light possesses a pleasing whiteness such as is suitable for interior illumination.

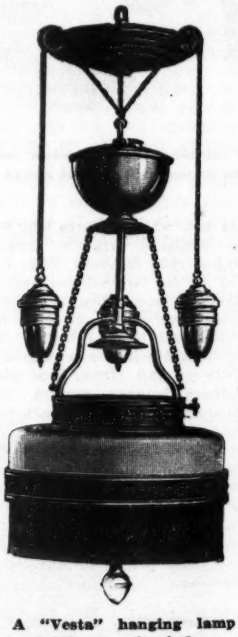
The consumption of kerosene by the "Vesta" lamp amounts to about 2¾ ounces per hour, with a candle power of 160, as against the 1,200 candle power of the "Autofax." The styles in which it can be furnished range from the plain wall or hanging design to elegantly finished patterns, such as harp-shaped with ornamental chains, and chandeliers with two, three or more lights.

Illustrated catalogues with full particulars of these and many other designs can be obtained free of charge.



A "Vesta" pressureless three-arm chandelier

The "Autofax" self-lighting oil gas lamp



A "Vesta" hanging lamp of 160 c. p., for indoors

Self-Filling Fountain Pens

A COMPREHENSIVE and attractive catalogue of self-filling fountain pens has been issued by the Conklin Pen Mfg. Co., 87 Conklin Bldg., Toledo, Ohio, U. S. A., in English, French, German, Spanish and Portuguese, each language appearing in a separate edition. The pens illustrated represent all desirable styles of the self-filling type, including screw cap pens of regular lengths, short pocket pens with screw caps, and pens of the regular slip-cap variety.

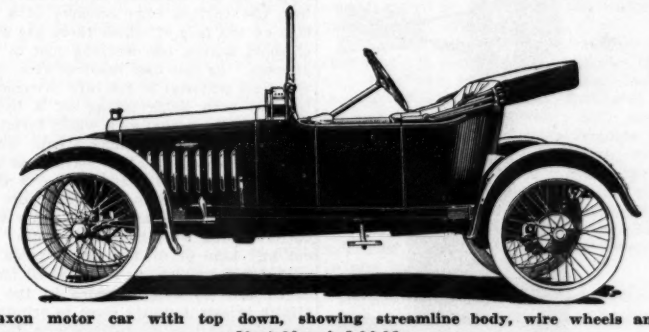
Requests for the catalogue should mention the language in which the information is desired, and to dealers who include a statement of the character of their business, the company is ready to send additional information which may be of value.

An Attractive Low-Priced Car

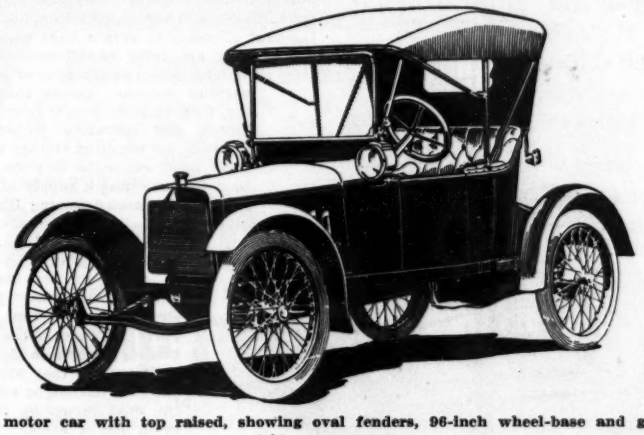
THE accompanying illustrations show a motor car that made its appearance a few months ago, and which apparently fulfills the predictions that have been made for many years that the price of an automobile would become so reduced that it would be possible for practically everybody to own one. The new car, which is known as the Saxon motor car, immediately achieved a notable popularity, as shown by the remarkable volume of sales, orders having steadily increased since its introduction, so that already the manufacturers have been compelled to increase the capacity of their factory. While the low price of this vehicle is, of course, an important feature, it is by no means the principal factor causing it to be regarded with such great favor by those interested in the automobile. Everyone who is at all familiar with the automobile industry is well aware of the thoroughness with which the prospective purchaser of a motor car will examine the various features of a new vehicle, and he knows that the salesmen's efforts will be wasted if he cannot offer real value for the money. It is this fact, the makers claim, that is mainly responsible for the popularity of the Saxon car, for except as regards the size and weight of the various parts, the specifications are about the same as those on automobiles costing far more.

While wonderfully low in price, nothing in the way of quality or appearance has been neglected, and so thoroughly has this been demonstrated that many wealthy men have purchased them, their ease of operating, simplicity and economy causing them to be preferred to a larger vehicle for ordinary use. Only a few weeks ago one of the most prominent millionaires in the United States bought one, with the intention of carrying it around on his yacht, its light weight rendering this possible and enabling him to obtain the convenience of a motor car no matter where he might be located.

The manufacturers of this car announce that the low price is due to the fact that from the very beginning it was designed so as to eliminate weight without affecting strength or durability, and to cut down the labor costs. In consequence material has been saved and the car has been rendered so simple to make and to put together that labor-saving machinery has been used to an unusual extent and the remarkable quality and unexampled low price of the Saxon motor car made possible.



Saxon motor car with top down, showing streamline body, wire wheels and adjustable windshield



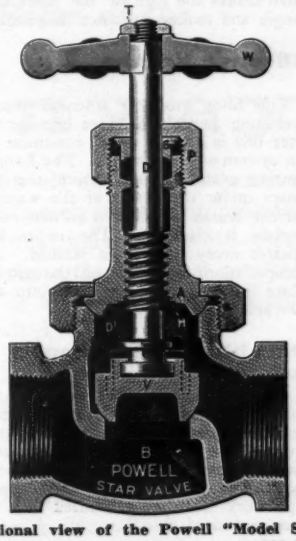
Saxon motor car with top raised, showing oval fenders, 96-inch wheel-base and general trim appearance

Partial specifications show that the construction of this car differs in no way from that of the highest-priced automobiles, except in size, and that standard motor car practice has been followed in all essential features. The front axle is a single piece drop forging and has ball bearings in the hubs; the rear axle is of the semi-floating type, with pressed steel housing, and the outer end of the drive shaft is carried on Hyatt roller bearings; two sets of brakes are provided on the rear wheels; body, stream-line for two passengers, made of stamped steel and affording ample room; left-hand steer and center control; sliding gear transmission, two speeds forward and one reverse; shaft drive, clutch, dry plate, five plate, steel on woven wire asbestos; pressed steel frame; Atwater-Kent ignition; standard tread, 96-inch wheel base; tires, 28x3 inches, clincher; 28-inch wheels with wire spokes; steering gear, bevel gear type, sector and pinion; motor, L-head, 15-horsepower, four-cylinder cast en bloc; cam shaft, drop forged of special steel, diameter 1-inch; crank shaft, drop forged of special steel, with two bearings; crank shaft bearings of bronze, Babbitt metal lined; vacuum feed oiling system; thermo syphon cooling system; cantilever type springs, with main leaf of vanadium steel; equipment, top, windshield, two gas head lights, oil tail light, gas generator and bulb horn.

Those interested in the purchase of a thoroughly reliable low-priced motor car should write for a catalogue giving prices, full specifications and other information, addressing the Saxon Motor Company, Detroit, Mich., U. S. A.

A New Patent Valve

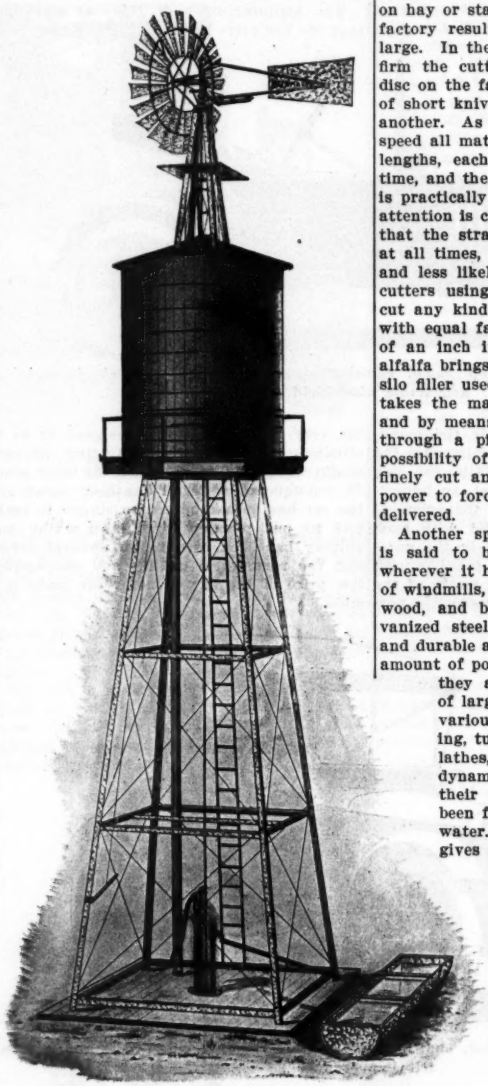
THE accompanying illustration gives a sectional view of a new patent valve that has just been placed on the market by the William Powell Company. It is one of their regular models, built for working pressures up to 200 pounds. The distinctive feature of this, as well as the other "Model Star" valves of the Powell Company, is the ease with which the disc may be reground or renewed. Their success is attested by the fact that they have for many years been used on all classes of Government vessels, and have, according to the firm, been employed in practically every power house in this country. All "Model Star" valves are cast of steam bronze composition, are carefully assembled and tested to double their working pressure, and are unconditionally guaranteed. They are made in medium and extra heavy patterns, as well as with screw and flanged ends. Inquiries should be addressed to the Wm. Powell Company, Cincinnati, Ohio, U. S. A.



Sectional view of the Powell "Model Star" valve for working pressures up to 200 lbs.

A Line of Agricultural Specialties.

FARMERS, planters, stock raisers, dairymen and merchants dealing in agricultural supplies will find it well worth their while to obtain the various catalogues published by the Kalamazoo Tank & Silo Company, of Kalamazoo, Mich., U.S.A., for included therein is a very complete description, together with illustrations showing the appearance, methods of operation and construction of a most extensive line of silos, windmills, pumps, tanks, towers, feed cutters, and other requirements of the farm, plantation or country estate.



A Kalamazoo windmill pumping outfit complete, including tower, tank and watering trough

Up-to-date cattle or sheep raisers and dairymen are well aware of the advantages to be derived from properly constructed silos, and their use is extending rapidly in practically every part of the world. Aside from the greater feeding value of silage, one very important feature, especially in those sections periodically subject to prolonged periods of dry weather, is that the owner of a well-filled silo is free from the terrors of drought, as it provides a supply of succulent food for the farm animals when any emergency of this kind arises. In addition to manufacturing wooden silos, which can be knocked down for shipment, the firm make a specialty of supplying such fittings as doors, hoops, lugs, hinges, etc., to those who are able to build the silos themselves, thus enabling many persons in localities where freight charges are high to acquire one of these conveniences at a very moderate expenditure.

The problem of filling a silo was formerly quite difficult to solve, especially in places where competent and reliable help was scarce, and this fact has led to the production of the Kalamazoo line of ensilage cutters and silo fillers. As the material used for ensilage varies considerably in size and texture, it follows that the ordinary knife, such as used on hay or stalk cutters, would not give satisfactory results, as the pieces would be too large. In the machines manufactured by this firm the cutting edge consists of a circular disc on the face of which there are a number of short knives, one working just in front of another. As this disc revolves at a very high speed all material is cut into extremely short lengths, each knife taking off a little at a time, and the action as a whole forming what is practically one continuous cut. Particular attention is called to this feature, as it means that the strain on the machine is the same at all times, rendering it much more durable and less likely to get out of order than the cutters using a single-bladed knife. It will cut any kind of fodder, either green or dry, with equal facility, and if desired one-eighth of an inch in length, which in the case of alfalfa brings it pretty close to grinding. The silo filler used in connection with this cutter takes the material direct from the machine, and by means of a powerful fan forces it up through a pipe into the silo. There is no possibility of clogging as the forage is very finely cut and the air blast is of sufficient power to force it through the pipe as fast as delivered.

Another specialty of this company, which is said to be receiving favorable comment wherever it has been introduced, is their line of windmills, both with direct stroke, made of wood, and back geared, constructed of galvanized steel. These mills are very strong and durable and are claimed to deliver a large amount of power in even a light wind. While they are being used—especially those of large size—as a source of power for various purposes, among them churning, turning grindstones, running small lathes, and operating moderate-sized dynamos for charging storage batteries, their most extensive employment has been for providing a supply of running water. The accompanying illustration gives a very clear idea of the appearance of a complete pumping outfit, from which water can be piped to the stable, the house or any other place desired. The different working parts of these mills are extremely simple and strongly built and, as they are entirely encased, cannot be affected by the dust raised by the wind, or by ice or snow. They are automatically controlled, regulating themselves according to the strength of the wind, by means of what is claimed by the manufacturers to be the most effective governing device ever placed on a windmill. The towers are made of the best quality steel, heavily galvanized and guaranteed by the makers to be proof against any and all climatic conditions, while the pumps are the product of a concern who have an international reputation for the quality of their output. The Kalamazoo Tank & Silo Company welcome inquiries from any person interested in articles of the above class, and will be pleased to mail to any address catalogues and other particulars pertaining thereto whenever requested.

PROSPECTIVE automobile purchasers should write to the Moline Automobile Company of East Moline, Ill., U. S. A., for a copy of their new illustrated catalogue in which will be found specifications of their Moline Knight 50 h. p. motor, which is claimed to be more durable and much more economical than any other motor on the market.

United States Tariff Book for 1913

MESSRS. F. B. Vandegrift & Co., Custom House Brokers and Forwarders, of 15 to 25 Whitehall Street, New York City, U. S. A., announce that they have published and now have ready for distribution the third edition of Vandegrift's United States Tariff, 1913. This valuable work should be in the hands of every business house connected in any way with the import trade of the United States, as it contains a vast amount of authoritative information pertaining to the new tariff act, customs administration and income tax law. A complete schedule of duties, alphabetically arranged, containing about 30,000 articles enumerated by name, rates of duty, and the decisions of the Treasury Department, Board of United States General Appraisers and Courts thereon are also given. There is also a list of the commodities imported upon which drawbacks have been allowed, together with the names of the manufacturers and references to the decisions, this being the only book of the kind giving this information.

Tables of foreign moneys, weights and measures, with their United States equivalent, foreign express tariffs, etc., and in addition many special acts form not the least interesting portion of its contents. The volume, which is handsomely bound in cloth, contains 1,000 pages and will be sent to any address upon receipt of $3.25 U. S. gold or its equivalent. The publishers state that they are desirous of securing agents in all foreign countries and will be pleased to submit terms to any responsible person upon receipt of name and address.

Packless Radiator Valves

"A RADIATOR Valve that Can't Leak" is the title of a 16-page booklet describing the Detroit packless radiator valve, manufactured by the Detroit Lubricator Company, Detroit, Mich., U. S. A.

The booklet opens with an outline of the causes of the deterioration in valves of common type and of the consequent losses in the way of loosened plaster, discolored walls, ceilings and floorings, etc. The essential points of tightness and attractiveness in the Detroit valve are then taken up, followed by various stock-numbered types of the valve and roughing-in dimensions for installation.

For those who wish a lucid explanation of radiator valve troubles, their causes and the means of overcoming them, the booklet will be very valuable.

Wearing Apparel for Particular Men

GENTLEMEN who appreciate the satisfaction to be derived from the wearing of well-made clothing designed in accordance with present day styles will find much to interest them in the copiously illustrated little catalogue that is being distributed by Messrs. Thomas & Sons, tailors and breeches makers, of 32 Brooke Street, Grosvenor Square, London, W., Eng., and 8 Avenue de Friedland. Paris, France. Included therein will be found examples of the latest fashions of men's apparel, among them evening clothes, dinner coats, walking and business suits, light, medium and heavy weight overcoats, raglans, etc. Gentlemen who are particular regarding their dress, will also be able to obtain numerous hints as to the proper thing to wear upon stated occasions from this little pamphlet, with the assurance that the different styles shown are authoritative. Thomas & Sons desire to announce that they specialize in the making of clothing from self measurements, and that if the directions, which they will forward to any address upon request, be followed they will guarantee a perfect fit. Interested parties should write to the firm for a copy of this catalogue and such other information as they may desire.